UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON D.C., 20460

OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

MEMORANDUM **Date: October 12, 2007**

SUBJECT: Mycobutanil. Ecological Risk Assessment on New Uses for Tropical Fruit, Fruiting Vegetables and Artichokes

PC Code: 128857
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DP Barcode: 336613

FROM: Pamela Hurley, Toxicologist
James Wolf, Environmental Scientist
Environmental Risk Branch III
Environmental Fate and Effects Division (7507P)
Office of Pesticide Programs

Pamela M Hurley
James K Wolf

THROUGH: for:
Karen Whitby, Branch Chief
Environmental Risk Branch III
Environmental Fate and Effects Division (7507P)
Office of Pesticide Programs

Colleen M. Flaherty
12 Oct 2007

TO: Barbara Madden/Daniel Rosenblatt RM 05
RIMUERB
Lisa Jones/Mary Waller RM 21
Fungicide Branch
Registration Division (7505P)
Office of Pesticide Programs

This memorandum transmits the Environmental Fate and Effects Division's (EFED) environmental risk assessment for the proposed new uses for myclobutanil on fruiting vegetables (crop group 8, except tomatoes), leafy vegetables (crop subgroup 4A except spinach), artichokes and tropical fruits. The proposed application rates, number of applications and application intervals range from 0.10 to 0.25 lb a.i./A, 4 to 8 per season and 10 to 14 days, respectively. The maximum application rate and number of applications is proposed for the tropical fruit use. It is proposed that the fungicide can be applied by ground and aerial spray and with irrigation (chemigation).

The results of this screening-level assessment indicate a potential for direct adverse effects to non-target freshwater fish, marine/estuarine invertebrates, birds (reptiles and terrestrial-phase amphibians) and mammals following acute exposure and for direct adverse effects to birds and mammals following chronic exposure for selected proposed uses. Due to the potential for direct adverse effects to animal species associated with the application of myclobutanil on the

proposed use sites, indirect effects may also result as a consequence of the potential direct effects on the taxonomic groups listed above. More detailed risk conclusions are provided in the executive summary of the environmental risk assessment document. These conclusions are different from the most recent risk assessment provided by EFED on myclobutanil (new uses on hops and soybeans from J. Goodyear to M. Waller (12/18/2006, D323805)), but not from risk assessments prior to that time (i.e., new uses on tomatoes and cucurbits; expanded uses on pome fruits and IR-4 uses (asparagus, caneberry, currants, gooseberries, mint, snap beans, and strawberries); memorandum from Thuy Nguyen to Mary Waller (2/7/2000 D260111)). The current assessment utilizes the latest versions of exposure modeling for both aquatic and terrestrial exposure.

Labeling Issues

Label Uncertainty

The labels do not define whether or not "per season" means that only one crop may be grown from a given field in a year (or more than 1 crop cycle per year is possible which infers multiple seasons or crops per year). According to IR-4 sources, as many as three crops of lettuce may be grown from the same ground per year in Florida (communication from B. Madden, 08-24-07). The remaining uses assume only 1 season per year.

Two sets of draft labels were submitted to EFED. The first set of labels for RALLY® 40 WSP has geographic use restrictions, the second set does not. The labels for NOVA® 40 W also had geographic restrictions (precluded use in AK, AZ, CA, HI, ID, MT, NV, OR, UT, WA, and WY). The geographic restrictions on the NOVA® 40 W and RALLY® 40 WSP labels does not appear to agree with the proposed new uses. The draft Rally 40 WSP labels restricts its use to AK, ID, MT, NV,OR, UT, WA, and WY and the Nova 40 W label precludes its use in 11 states, including AZ, CA, and HA, yet the proposed new use is tropical fruit. The confusion in the labels should be addressed.

Suggestions for Hazard Labeling

Environmental Hazards

Manufacturing Use:

This pesticide is toxic to freshwater fish and marine/estuarine invertebrates. Do not discharge effluent containing this product into lakes, streams, ponds, estuaries, oceans or other waters unless in accordance with the requirements of a National Pollutant Discharge Elimination System (NPDES) permit and the permitting authority has been notified in writing prior to discharge. Do not discharge effluent containing this product to sewer systems without previously notifying the local sewage treatment plant authority. For guidance contact your State Water Board or Regional Office of the EPA. Do not contaminate water when disposing of equipment washwaters.

End Use Products:

This pesticide is toxic to freshwater fish and marine/estuarine invertebrates, birds and mammals. Do not apply directly to water, to areas where surface water is present, or to intertidal areas below the mean high water mark. Drift and runoff may be hazardous to aquatic organisms in water adjacent to treated areas. Do not contaminate water when disposing of equipment wash waters or rinsate.

Surface Water Label Advisories:

Myclobutanil and the degradate 1,2,4-triazole may contaminate water through drift of spray in wind. This product has a high potential for runoff for several months or more after application. Poorly draining soils and soils with shallow water tables are more prone to produce runoff that contains this product. Avoid applying this product to ditches, swales, and drainage ways. Runoff of this product will be reduced by avoiding applications when rainfall is forecasted to occur within 48 hours.

Ground Water Advisory:

Myclobutanil and the degradate 1,2,4-triazole has properties and characteristics associated with chemicals detected in ground water and detections are reported in ground water in ground water monitoring data in the publicly available literature. The use of this chemical in areas where soils are permeable, particularly where the water table is shallow, may result in ground-water contamination.

Data Gaps

Table 1 summarizes the data gaps in this assessment and the value of additional testing.

Table 1. Summary of Data Gaps and Value of Additional Ecotoxicity and Fate Testing for Myclobutanil

Selected Uncertainty	Value of Additional Testing	Comment
Aquatic Assessment		
Acceptable freshwater invertebrate life cycle	Low	A chronic study on freshwater invertebrates is not required if a chronic study on estuarine/marine invertebrates is conducted. A chronic study on estuarine/marine invertebrates is needed because myclobutanil is highly acutely toxic to these organisms and because it is expected to be used around estuarine/marine environments. A
Acceptable estuarine/marine invertebrate life cycle	High	
Acceptable estuarine/marine fish life cycle	Low	

Table 1. Summary of Data Gaps and Value of Additional Ecotoxicity and Fate Testing for Myclobutanil		
Selected Uncertainty	**Value of Additional Testing**	**Comment**
		chronic study on estuarine/marine fish is not required because sufficient data are available on fish such that an extrapolation of the chronic endpoint may be used.
Aquatic plant algae	Low	One study is available on aquatic non-vascular plants which indicates that myclobutanil is probably not toxic to this taxon. No data are available for aquatic vascular plants. Although incident data for terrestrial plants indicate that myclobutanil may damage terrestrial plants, the labels permit use around agricultural crops. Any damage to crops naturally limit the use.
Aquatic plant acute EC_{50}	Low	
Anaerobic Aquatic Metabolism	High	Myclobutanil is expected to reach surface water and has demonstrated toxicity to aquatic organisms; therefore, data are needed to get a better estimate of persistence in water.
Aerobic Aquatic Metabolism	High	Myclobutanil is expected to reach surface water and has demonstrated toxicity to aquatic organisms; therefore, data are needed to get a better estimate of persistence in water.
Terrestrial Assessment		
Avian reproduction	Low	Although the highest concentration tested was lower than normally seen in acceptable studies, the terrestrial EECs are sufficiently low for these uses such that new studies are not needed at this time.
Seedling Emergence	Low	Incident data indicate potential damage to terrestrial plants. The fact that myclobutanil is labeled for use around agricultural crops indicates that toxicity to plants may not be sufficiently high to warrant requesting laboratory data.
Vegetative Vigor	Low	
Acute honey bee contact LD_{50} Acute honey bee 5-day oral LD_{50}	Low	In light of current decreasing trends in honeybee populations, it would be appropriate to ask for new studies; however, available supplemental data indicates that myclobutanil may not be toxic to honeybees.
Honey Bee Residue on Foliage	Low	

Uncertainties

The aerobic and anaerobic aquatic metabolism study requirements have not been met. Therefore, the Agency assumes that the residues of concern are persistent for the exposure assessment. This uncertainty may be met by submission of aerobic and anaerobic aquatic metabolism studies. Only one chronic study is available for aquatic animals (freshwater fish). The chronic toxicity value for marine/estuarine fish was estimated using an acute to chronic ratio with acute studies with freshwater and marine/estuarine fish and a chronic study with freshwater fish. Therefore, there is uncertainty associated with the chronic toxicity value for marine/estuarine fish. This uncertainty may be met by submission of a chronic study in marine/estuarine fish; however, this study is not required at this time (see above table). A quantitative assessment of risk following chronic exposure was not possible for aquatic invertebrates because no chronic studies are available for either freshwater or marine/estuarine invertebrates. Myclobutanil is highly acutely toxic to these marine/estuarine invertebrates. The uncertainty associated with the risk to estuarine/marine invertebrates and freshwater invertebrates following chronic exposure may be met by submission of a chronic study with estuarine/marine invertebrates. A chronic study with estuarine/marine invertebrates may be used in an acute to chronic ratio with freshwater invertebrates to estimate chronic risk to freshwater invertebrates. Very little plant data are available. Data are only available for aquatic non-vascular plants. No plant studies are requested for myclobutanil. Although incident data indicate potential damage to terrestrial plants, it is not toxic to aquatic non-vascular plants and it is already registered for use around agricultural crops, indicating that toxicity to plants may not be sufficiently high to indicate a concern.

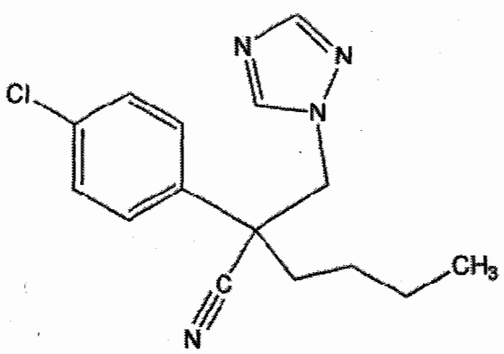
ECOLOGICAL RISK ASSESSMENT

Section 3 (New Uses on Selected Crops)

MYCLOBUTANIL

(PC Code 128857, CASN 88671-89-0)

IUPAC Name: 2-*p*-chlorophenyl-2-(1*H*-1,2,4-triazol-1-ylmethyl)hexanenitrile; 2-(4-chlorophenyl)-2-(1*H*-1,2,4-triazol-1-ylmethyl)hexanenitrile



CAS Name: alpha-butyl-alpha-(4-chlorophenyl)-1*H*-1,2,4-triazole-1-propanenitrile
Chemical Abstracts Registry Number: 88671-89-0

USEPA PC Code #: 128857

Environmental Fate and Effects Division Team Members:

James Wolf, Environmental Scientist
Pamela Hurley, Toxicologist
James Hetrick, Senior Fate Scientist

Secondary Reviewers:

Stephanie Syslo, Environmental Scientist

Branch Chief: Karen Whitby
Date: October 12, 2007

I. EXECUTIVE SUMMARY

A. Nature of Chemical Stressor

New uses have been requested for the systemic fungicide, myclobutanil to control powdery mildew on fruiting vegetables (crop group 8, except tomatoes), leafy vegetables (crop subgroup 4A except spinach) and artichokes, and for disease control in tropical fruits. Myclobutanil (alpha-butyl-alpha (4-chlorophenyl)-1H-1,2-triazole-1-propane-nitrile) is a triazole fungicide in the conazole class of fungicides (Figure 1). Myclobutanil appears to be a specific inhibitor of sterol 14-demethylase, which disrupts the ergosterol biosynthesis pathway which is vital to fungal cell wall formation. Thus, it is classified as a demethylation inhibitor (DMI) fungicide.

The proposed application rates range from 0.10 to 0.25 lb a.i./A. The number of applications range from 4 to 8; the minimum reapplication interval ranges from 10 to 14 days. The maximum proposed rate is for tropical fruit is 0.25 lb a.i./A per application with a maximum seasonal application rate of 2.0 lb a.i./A with a minimum reapplication interval of 14 days. The maximum application rate and number of applications is proposed for the tropical fruit use. It is proposed that the fungicide can be applied by ground and aerial spray and with irrigation (chemigation). A national assessment was considered.

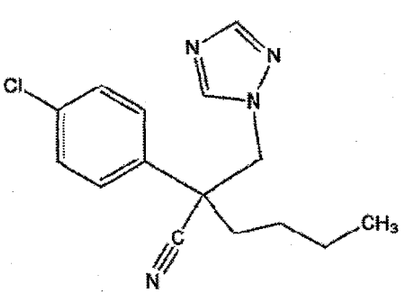


Figure 1. Chemical Structure of Myclobutanil Active Ingredient

B. Potential Risks to Non-target Organisms

The results of this screening-level assessment indicate a potential for direct adverse effects to non-target freshwater fish, marine/estuarine invertebrates, birds (reptiles and terrestrial-phase amphibians) and mammals following acute exposure and for direct adverse effects to birds and mammals following chronic exposure for selected proposed uses (**Tables 1 and 2**). Due to the potential for direct adverse effects to animal species associated with the application of myclobutanil on the proposed use sites, indirect effects may also result as a consequence of the potential direct effects on the taxonomic groups listed above.

Table 1. Summary of Environmental Risk Conclusions for Aquatic Animals and Plants

Taxonomic Group	Risk Endpoint	Summarized Risk Characterization and Important Uncertainties
Freshwater Fish and Aquatic Phase Amphibians	Acute Risk	Acute LOC for listed fish exceeded for one scenario for tropical fruit.
	Chronic Risk	None of the RQs exceed the chronic LOC for freshwater fish for any of the proposed uses. Risk to freshwater fish following chronic exposure is not expected.
Freshwater Invertebrates	Acute Risk	None of the RQs exceed the acute LOC for freshwater invertebrates for any of the proposed uses. Risk to freshwater invertebrates following acute exposure is not expected.
	Chronic Risk	No chronic data are available. Therefore, risks were not estimated. Lack of data does not preclude potential risk to freshwater invertebrates following chronic exposure.
Marine/ Estuarine Fish	Acute Risk	None of the RQs exceed the acute LOC for marine/estuarine fish for any of the proposed uses. Risk to marine/estuarine fish following acute exposure is not expected.
	Chronic Risk	No chronic data are available. Using an acute to chronic ratio with freshwater fish acute and chronic data and marine/estuarine fish acute data, a chronic toxicity value for estuarine/marine fish was estimated. Utilizing estimated chronic endpoint for marine/estuarine fish, none of the RQs exceed the chronic LOC for estuarine/marine fish for any of the proposed uses. Risk to estuarine/marine fish following chronic exposure is not expected. There is uncertainty in endpoint because it was extrapolated using a comparison to freshwater endpoints.
Marine/ Estuarine Invertebrates	Acute Risk	For mollusks, estimated RQs exceed the acute LOC for listed marine/estuarine invertebrates with proposed uses on tropical fruit and lettuce with either aerial or ground applications. For crustaceans, the acute LOC for listed marine/estuarine invertebrates is exceeded for all proposed uses with either aerial or ground applications.
	Chronic Risk	No chronic data are available. Therefore, risks were not estimated. Lack of data does not preclude potential risk to estuarine/marine invertebrates following chronic exposure, especially due to expected acute risks.
Aquatic Plants	Acute Risk	LOC for aquatic non-vascular plants not exceeded for any proposed uses. There is uncertainty in risk to non-vascular plants because data are only available on one species of non-vascular plant. No

Table 1. Summary of Environmental Risk Conclusions for Aquatic Animals and Plants		
Taxonomic Group	**Risk Endpoint**	**Summarized Risk Characterization and Important Uncertainties**
		data are available on aquatic vascular plants. Lack of data does not preclude potential risk to aquatic vascular plants.

Table 2. Summary of Environmental Risk Conclusions for Terrestrial Animals and Plants		
Taxonomic Group	**Risk Endpoint**	**Summarized Risk Characterization and Important Uncertainties**
Birds, Reptiles and Terrestrial Phase Amphibians	Acute Risk	Acute LOC for listed birds is exceeded for proposed tropical fruit, fruiting vegetables and other crops with same application rates and artichoke uses with several food categories (dose-based).
	Chronic Risk	Using the terrestrial EECs for the parent myclobutanil, none of the RQs exceed the chronic LOC for birds for any of the proposed uses. Risk to birds following chronic exposure not expected. With estimated maximum combined residues from the parent and the 1,2,4-triazole degradate, the RQ exceeds the chronic LOC for birds with the tropical fruit use (short grass only).
Mammals	Acute Risk	Acute LOC for listed mammals exceeded for proposed tropical fruit uses with mammals eating short grass but with no other uses or food categories.
	Chronic Risk	Chronic LOC for mammals on a dietary basis is exceeded for the proposed tropical fruit uses for mammals eating short grass. Chronic LOC for mammals on a dose basis is exceeded for all weight classes for all uses for mammals eating short grass. Tropical fruit use: exceeded for all weight classes for tall grass, broadleaf plants and small insects. All other uses: exceeded for tall grass (15 g mammals) and for broadleaf plants and small insects (15 and 35 g mammals. With estimated maximum combined residues from the parent and the 1,2,4-triazole degradate the following additional dose-based RQs exceed the chronic LOC for mammals: leafy greens (10- day application interval, broadleaf plants and small insects, 1000 g mammals); fruiting vegetables (10- and 14-day application intervals) and artichoke uses (tall grass, 35 g mammals).
Non-target Invertebrates	Acute Risk	Quantitation of risk not officially incorporated at this time. Supplemental data on honey bees indicates that risk to terrestrial invertebrates may be low; however, data are not sufficient. Therefore, there is uncertainty associated with the risk to terrestrial invertebrates.
Terrestrial Plants	Acute Risk	No terrestrial plant data are available. Therefore, risks were not estimated. In light of incidence reports with damage to plants, (classified as possibly related to exposure to myclobutanil), lack of data does not preclude potential risk to terrestrial plants following exposure.

Table 3 summarizes the listed species at risk associated with either direct or indirect effects following application of myclobutanil.

Concerns For Federally Listed as Endangered and/or Threatened Species

Table 3. Listed Species Risks Associated With Direct or Indirect Effects from Myclobutanil Use.

Listed Taxon	Direct Effects	Indirect Effects
Terrestrial and semi-aquatic plants - monocots	No data are available	Yes through effects to pollinators (mammals, birds, reptiles, terrestrial-phase amphibians)
Terrestrial and semi-aquatic plants – dicots	No data are available	Yes through effects to pollinators (mammals, birds, reptiles, terrestrial-phase amphibians)
Terrestrial invertebrates	No	No
Birds	Yes	Yes through effects to mammals, freshwater fish, birds and estuarine/marine invertebrates
Terrestrial-phase amphibians	Yes[1]	Yes through effects to mammals, freshwater fish, birds and estuarine/marine invertebrates
Reptiles	Yes[1]	Yes through effects to mammals, freshwater fish, birds and estuarine/marine invertebrates
Mammals	Yes following acute and chronic exposure	Yes through effects to mammals, freshwater fish, birds and estuarine/marine invertebrates
Aquatic non-vascular plants	No	No
Aquatic vascular plants	No data are available	No
Freshwater fish	Yes following acute exposure	Yes through effects to freshwater fish and aquatic amphibians
Aquatic-phase amphibians	No[2]	Yes through effects to freshwater fish and aquatic amphibians
Freshwater invertebrates	No (no chronic data available)	Yes through effects to freshwater fish and aquatic amphibians
Mollusks	No (no chronic data available)	Yes through effects to freshwater fish and aquatic amphibians
Marine/estuarine fish	No (extrapolated chronic value from freshwater fish)	Yes through effects to marine/estuarine invertebrates
Marine/estuarine invertebrates	Yes following acute exposure (no chronic data available)	Yes through effects to marine/estuarine invertebrates

[1] Results from avian species used as surrogate for assessing risk to terrestrial-phase amphibians and reptiles.
[2] Results from freshwater fish used as surrogate for assessing risk to aquatic-phase amphibians

C. Conclusions – Environmental Fate and Transport Characterization

Based on a sparse data set, myclobutanil is expected to be persistent and mobile with primary routes of dissipation through leaching, runoff, and spray drift. It is stable to

hydrolysis and to photolysis. Myclobutanil degradation is controlled by microbial-mediated transformations. Myclobutanil is moderately persistent to persistent in aerobic soils and persistent in anaerobic soils. The major degradation products observed in the aerobic soil metabolism studies were 1,2,4-triazole, CO_2, a polar degradate (β-4-chlorophenyl-β-cyano-γ-(1H-1,2,4-triazole)-butyric acid) and unextractable residues. Degradation does not appear to follow first order kinetics based upon visual inspection, but follows a hockey stick degradation pattern (a rapid initial decline followed by a slower decline); thus, the calculated first-order half-life does not accurately describe the decline of myclobutanil residues in intermediate time periods (it captures early and late behavior). The decline of the combined residues (myclobutanil plus 1,2,4-triazole) also follows the "hockey stick" pattern. Potential for accumulation in soil is possible due to the persistence, especially when there are multiple applications.

D. Conclusions - Effects Characterization

Myclobutanil is classified as moderately acutely toxic to freshwater and marine/estuarine fish and slightly toxic to freshwater invertebrates. It is highly toxic to estuarine/marine invertebrates. Chronic data on aquatic organisms are only available for freshwater fish. No data are available to aquatic vascular plants. Myclobutanil is classified as slightly acutely toxic to birds, both on a dose and dietary basis. No effects were observed in the avian reproduction studies; however, the highest concentration level tested was not a particularly high concentration level for this type of study. In mammals, myclobutanil is also classified as slightly toxic. Reproductive effects were observed in the mammalian reproduction study (increases in testicular, epididymal and prostatic atrophy, a slight increase in the number of stillborns and a decrease in pup body weight gain during lactation). Supplemental data on honey bees exposed to a myclobutanil dust indicate that it may not be toxic to terrestrial invertebrates. No data are available for terrestrial plants. Incident data indicate that myclobutanil may cause damage to terrestrial plants; however, it is labeled for use on multiple agricultural crops, indicating that toxicity to plants may not be sufficiently high to indicate a concern.

Acute mammalian toxicity data on myclobutanil formulations indicate that with one exception (the 60% formulation), the formulations are not more acute toxic than the technical grade parent. Available acute and reproduction studies on the degradate 1,2,4-triazole indicate that for mammals, the degradate is equally toxic as the parent.

E. Uncertainties and Data Gaps

Table 4 summarizes the data gaps in this assessment and the value of additional testing.

Table 4. Summary of Data Gaps and Value of Additional Ecotoxicity and Fate Testing for Myclobutanil

Selected Uncertainty	Value of Additional Testing	Comment
Aquatic Assessment		
Acceptable freshwater invertebrate life cycle	Low	A chronic study on freshwater invertebrates is not required if a chronic study on estuarine/marine invertebrates is conducted. A chronic study on estuarine/marine invertebrates is needed because myclobutanil is highly acutely toxic to these organisms and because it is expected to be used around estuarine/marine environments. A chronic study on estuarine/marine fish is not required because sufficient data are available on fish such that an extrapolation of the chronic endpoint may be used.
Acceptable estuarine/marine invertebrate life cycle	High	
Acceptable estuarine/marine fish life cycle	Low	
Aquatic plant algae	Low	One study is available on aquatic non-vascular plants which indicates that myclobutanil is probably not toxic to this taxon. No data are available for aquatic vascular plants. Although incident data for terrestrial plants indicate that myclobutanil may damage terrestrial plants, the labels permit use around agricultural crops. Any damage to crops naturally limit the use.
Aquatic plant acute EC_{50}	Low	
Anaerobic Aquatic Metabolism	High	Myclobutanil is expected to reach surface water and has demonstrated toxicity to aquatic organisms; therefore, data are needed to get a better estimate of persistence in water.
Aerobic Aquatic Metabolism	High	Myclobutanil is expected to reach surface water and has demonstrated toxicity to aquatic organisms; therefore, data are needed to get a better estimate of persistence in water.
Terrestrial Assessment		
Avian reproduction	Low	Although the highest concentration tested was lower than normally seen

Table 4. Summary of Data Gaps and Value of Additional Ecotoxicity and Fate Testing for Myclobutanil		
Selected Uncertainty	**Value of Additional Testing**	**Comment**
		in acceptable studies, the terrestrial EECs are sufficiently low for these uses such that new studies are not needed at this time.
Seedling Emergence	Low	Incident data indicate potential damage to terrestrial plants. The fact that myclobutanil is labeled for use around agricultural crops indicates that toxicity to plants may not be sufficiently high to warrant requesting laboratory data.
Vegetative Vigor	Low	
Acute honey bee contact LD_{50} Acute honey bee 5-day oral LD_{50}	Low	In light of current decreasing trends in honeybee populations, it would be appropriate to ask for new studies; however, available supplemental data indicates that myclobutanil may not be toxic to honeybees.
Honey Bee Residue on Foliage	Low	

The environmental fate data base is generally complete, although very limited. A larger data set would increase the confidence in the estimated exposure concentrations. Additionally, the soils (east coast soils) used for the sorption and metabolism studies did not include soils from California or Hawaii (volcanic) (major production areas for the proposed new uses). There is no aerobic aquatic and anaerobic aquatic metabolism data so it was estimated from the aerobic soil metabolism data. The degradation of myclobutanil does not appear to follow first-order kinetics, while the EFED exposure models assume first order kinetics. Several methods (linear regression and non-linear regression) were used to estimate a half-lives (or DT_{50}) for the input into the models. EFED selected the half-life(s) estimated by linear regression on the lognormal-transformed concentration data. The persistence observed in the aerobic soil metabolism and terrestrial dissipation studies indicate that the potential for carryover resulting in an accumulation of residues is possible under some conditions.

The GENEEC and PRZM and EXAMS models have limitations in their abilities to thoroughly account for spray drift, runoff, within-site variability, crop growth, soil water transport, and weather. These models also assume first order kinetics. Additionally, scenarios are not available for every proposed use or use area (i.e., HI), so surrogate scenarios must be used (LA and PR).

There no known targeted surface or ground water monitoring studies for myclobutanil, although, it has in been included in other monitoring studies (D336254).

The estimated environmental concentrations (EECs) for aquatic exposure were determined for myclobutanil alone and as combined residues of myclobutanil plus the 1,2,4-triazole degradation product. The assessment for combined residues assumed the

mobility of 1,2,4-triazole as it is slightly more mobile than myclobutanil. The combined residues provide an upper bound of exposure due the conservatism of the assumption concerning the degradation rates and mobility.

II. Problem Formulation

The purpose of this problem formulation is to provide the foundation for the ecological risk assessment being conducted for myclobutanil. As such, it articulates the purpose and objectives of the risk assessment, evaluates the nature of the problem, and provides a plan for analyzing the data and characterizing the risk (EPA, 1998).

A. Nature of Regulatory Action

The Environmental Fate and Effects Division (EFED) has prepared this ecological risk assessment to support new uses on fruiting vegetables (Crop Group 8), leafy vegetables (Crop Subgroup 4), and tropical fruits for the fungicide myclobutanil (Rally® 40WSP (No. 62719-410) and Nova® 40W (EPA Reg. 62719-411).

B. Stressor Source and Distribution

1. Nature of the Chemical Stressor

Myclobutanil is a triazole fungicide in the conazole class of fungicides which is a systemic fungicide used to control powdery mildew on a number of crops. Myclobutanil appears to be a specific inhibitor of sterol 14-demethylase, which disrupts the ergosterol biosynthesis pathway which is vital to fungal cell wall formation. It is classified as a demethylation inhibitor (DMI) fungicide.

The primary routes of dissipation of myclobutanil are through leaching, runoff, and spray drift. Myclobutanil degradation is controlled by microbial-mediated processes. Myclobutanil was moderately persistent to persistent (DT_{50} > 70 days) in aerobic soils and persistent in anaerobic soils. The major degradation products observed in the aerobic soil metabolism (ASM) studies were 1,2,4-triazole (maximum 18%), CO_2, a polar degradate (β-4-chlorophenyl-β-cyano-γ-(1H-1,2,4-triazole)-butyric acid; maximum 9 %), and unextractable residues.

2. Overview of Pesticide Usage

Myclobutanil is proposed for use on fruiting vegetables, leafy vegetables, and tropical fruits crop groups. Two products containing myclobutanil as the active ingredient (a.i.) are considered in this assessment: RALLY® 40 WSP (Registration No. 41719-410) and NOVA® 40 W (Reg. No. 41719-411). NOVA and RALLY are formulated in water-soluble pouches. They can be applied by ground and aerial spray or by chemigation (i.e., irrigation) at rates ranging from 0.1 to 0.25 lb a.i./A per application. Where a single crop

is grown per year 4 to 8 applications will be made; leafy vegetables such as lettuce may have up to 3 crops per year with up to 4 applications per crop.

C. Receptors

1. Aquatic and Terrestrial Effects

The receptor is the biological entity that is exposed to the stressor (EPA, 1998). Based on the proposed uses for myclobutanil, it is expected that the aquatic and terrestrial receptors will include freshwater fish and invertebrates, marine/estuarine fish and invertebrates, aquatic plants, terrestrial plants, birds, mammals and terrestrial invertebrates.

Consistent with the process described in the Overview Document (EPA, 2004), this risk assessment uses a surrogate species approach in its evaluation of myclobutanil. Toxicological data generated from surrogate test species, which are intended to be representative of broad taxonomic groups, are used to extrapolate to potential effects on a variety of species (receptors) included under these taxonomic groupings.

Acute and chronic toxicity data from studies submitted by pesticide registrants are used to evaluate the potential direct effects of myclobutanil to the aquatic and terrestrial receptors identified in this section. This includes toxicity data on the technical grade active ingredient, the major degradate, and, when available, formulated products (e.g. "Six-Pack" studies).

Table 5 provides a summary of the taxonomic groups and the surrogate species tested to help understand potential acute ecological effects of pesticides to these non-target taxonomic groups. In addition, the table provides a preliminary overview of the potential acute toxicity of myclobutanil by providing the acute toxicity classifications.

Table 5. Test Species Evaluated for Assessing Potential Ecological Effects of Myclobutanil and the Associated Acute Toxicity Classification

Taxonomic Group	Surrogate Species	Acute Toxicity Classification
Birds[1]	Mallard (*Anas platyrhynchos*) Bobwhite (*Colinus virginianus*)	Slightly toxic Slightly toxic
Mammals	Laboratory mouse (*Mus musculus*)	Parent: Slightly toxic 1,2,4-Triazole degradate: Practically nontoxic
Insects	Honey bee (*Apis mellifera L.*)	Insufficient data to classify
Freshwater fish[2]	Bluegill sunfish (*Lepomis macrochirus*) Rainbow trout (*Oncorhynchus mykiss*)	Moderately toxic Moderately toxic
Freshwater invertebrates	Water flea (*Daphnia magna*)	Slightly toxic
Estuarine/marine fish	Sheepshead minnow *(Cyprinodon variegatues)*	Moderately toxic
Estuarine/marine	Mysid shrimp *(Americamysis bahia)*	Highly toxic

Table 5. Test Species Evaluated for Assessing Potential Ecological Effects of Myclobutanil and the Associated Acute Toxicity Classification		
Taxonomic Group	**Surrogate Species**	**Acute Toxicity Classification**
invertebrates	Eastern oyster (*Crassostrea virginica)*	Highly toxic
Terrestrial plants[3]	Monocots – most sensitive species Dicots – most sensitive species	No data
Aquatic plants and algae	Duckweed (*Lemna gibba*) Green algae (*Selenastrum capricornutum*)	Not applicable

[1] Birds represent surrogates for terrestrial-phase amphibians and reptiles.

[2] Freshwater fish may be surrogates for aquatic-phase amphibians.

[3] Four species of two families of monocots, of which one is corn; six species of at least four dicot families, of which one is soybeans.

Chronic toxicity data are available for myclobutanil on freshwater fish, birds and mammals. A LOAEC value was not reported for birds because no effects were observed at the highest concentration tested. Mortality was reported in the chronic fish study with total mortality at the highest concentration level. Chronic reproductive effects were reported in the mammalian study on the parent and in the mammalian study on the 1,2,4-triazole degradate. The triazole degradate is not more toxic than the parent following chronic exposure. No other chronic toxicity studies are available for the degradate.

2. Ecosystems Potentially at Risk

The ecosystems at risk are often extensive in scope, and as a result it may not be possible to identify specific ecosystems during the development of a baseline risk assessment. However, in general terms, terrestrial ecosystems potentially at risk could include the treated field and areas immediately adjacent to the treated field that may receive drift or runoff. Areas adjacent to the treated field could include cultivated fields, fencerows and hedgerows, meadows, fallow fields or grasslands, woodlands, riparian habitats and other uncultivated areas.

Aquatic ecosystems potentially at risk include water bodies adjacent to, or down stream from, the treated field and might include impounded bodies such as ponds, lakes and reservoirs, or flowing waterways such as streams or rivers. For uses in coastal areas, aquatic habitat also includes marine ecosystems, including estuaries.

D. Assessment Endpoints

Assessment endpoints represent the actual environmental value that is to be protected, defined by an ecological entity (species, community, or other entity) and its attribute or characteristics (EPA, 1998). For myclobutanil, the ecological entities may include the following: birds, mammals, freshwater fish and invertebrates, estuarine/marine fish and invertebrates, terrestrial plants, insects, and aquatic plants and algae. The attributes for each of these entities may include growth, reproduction, and survival. (See Table 6 in Section II.F.3.b of the Analysis Plan, for further discussion).

E. Conceptual Model

A conceptual model provides a written description and visual representation of the predicted relationships between myclobutanil residues, potential routes of exposure, and the predicted effects for the assessment endpoint. A conceptual model consists of two major components: risk hypothesis and a conceptual diagram (EPA, 1998).

1. Risk Hypothesis

For a pesticide to pose an ecological risk, it must reach ecological non-target organisms (receptors) at biologically significant concentrations. An exposure pathway is the means by which a pesticide moves in the environment from the application site to non-target organisms. The evaluation of the ecological exposure pathways in this assessment includes an examination of the source and potential transport pathways for myclobutanil plus its degradation product of concern (1,2,4-triazole) and the determination of exposure routes of non-target species.

Myclobutanil, when used in accordance with the label, results in potential adverse effects upon the survival, growth, and reproduction of non-target terrestrial and aquatic organisms. Given the persistence of myclobutanil and 1,2,4-triazole, and their mobility, there is a likelihood of exposure to terrestrial and/or aquatic organisms.

2. Conceptual Model

The conceptual model is a graphic representation of the structure of the risk assessment. It specifies the stressor (myclobutanil), transport pathways, non-target organisms (receptors), and effects endpoints of potential concern. The conceptual model for both potential aquatic and terrestrial risk is shown in Figure 2. Exposure routes shown in dashed lines are not quantitatively considered because the resulting exposures are expected to be very low when compared to the major routes of exposure.

Exposure is expected to be dominated by direct deposition, runoff and spray drift. Myclobutanil is persistent and mobile and is expected to leach to groundwater which could, in turn, recharge surface waters. However, it is not considered a significant route of exposure when compared to the dominant exposure routes listed above. In addition, based on the vapor pressure, long-range transport is not considered a significant route of exposure. EFED does not currently have a means to estimate exposure from chemigation (irrigation). Direct exposure from chemigation would be expected not to exceed the exposure from the methods of application.

This screening-level assessment for spray applications of myclobutanil only considered dietary exposure. Other routes of exposure that were not considered in the assessment are incidental soil ingestion exposure, inhalation exposure, dermal exposure,

and drinking water exposure. These routes are not represented in the diagram. Further discussion of these routes can be found in the Assumptions, Limitations and Uncertainties Related to Exposure for Terrestrial Species section (IV.B.5.C.3).

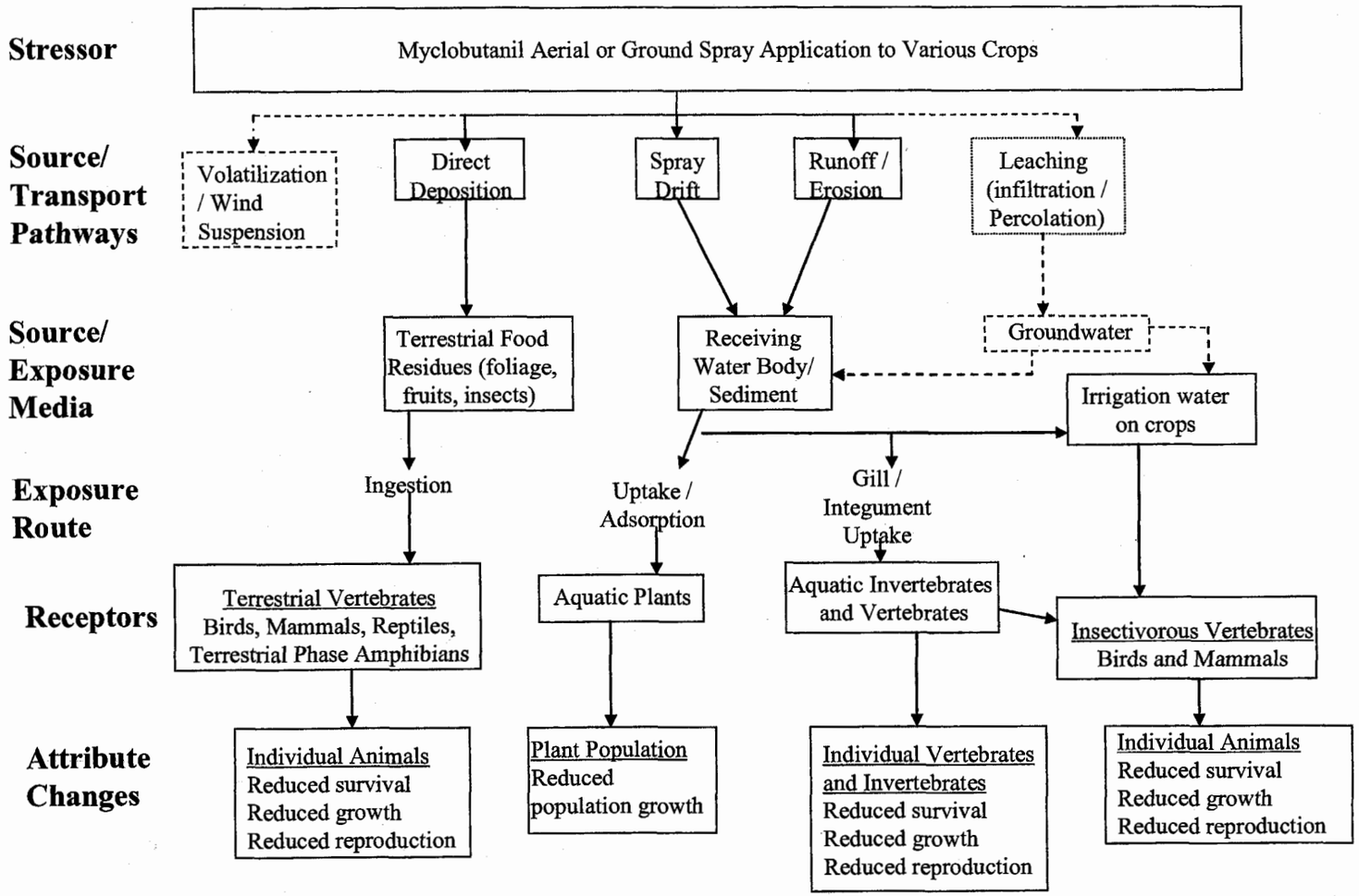


Figure 2 Conceptual Diagram for Aquatic and Terrestrial Risk

F. Analysis Plan

1. Conclusions from Previous Risk Assessments

The most recent ecological risk assessment conducted on myclobutanil was for use on hops and soybeans (D323805, D329420; 12/18/2006 and 7/18/2006). In that assessment (only parent myclobutanil was considered), no LOCs were exceeded for terrestrial animals or plants. For the use on hops, acute LOCs were exceeded for marine/estuarine invertebrates (RQs were 0.05 (eastern oyster) and 0.14 (mysids): (0.25 lb a.i./A, maximum of 8 applications and 0.019 (eastern oyster) and 0.054 (mysids): 0.25 lb a.i./A, maximum of 4 applications). The soybean use did not exceed any LOCs.

2. Preliminary Identification of Data Gaps and Analysis Plan

The aerobic and anaerobic aquatic metabolism study requirements have not been met. Therefore, the Agency assumes that the residues of concern are persistent for the exposure assessment. Only one chronic study is available for aquatic animals (freshwater fish). The chronic toxicity value for marine/estuarine fish was estimated using an acute to chronic ratio with acute studies with freshwater and marine/estuarine fish and a chronic study with freshwater fish. Therefore, there is uncertainty associated with the chronic toxicity value for marine/estuarine fish. A quantitative assessment of risk following chronic exposure was not possible for aquatic invertebrates because no chronic studies are available for either freshwater or marine/estuarine invertebrates. Therefore, a new study is needed for estuarine/marine invertebrates because myclobutanil is so acutely toxic to these taxonomic groups. Very little plant data are available. Data are only available for aquatic non-vascular plants. No plant studies are requested for myclobutanil. Although incident data indicate potential damage to terrestrial plants, it is not toxic to aquatic non-vascular plants and it is already registered for use around agricultural crops, indicating that toxicity to plants may not be sufficiently high to indicate a concern.

3. Measures of Exposure and Effects

EFED uses a tiered system of pesticide exposure modeling to assess risk of a pesticide product to the environment. This tiered system is designed to minimize the amount of analysis which is required to register any given chemical. Each of the tiers is designed to screen out pesticides by requiring higher, more complex levels of investigation only for those that have not passed the next lower tier. Each tier screens out a percentage of pesticides from having to undergo a more rigorous review prior to registration or reregistration.

a. Aquatic Exposure Models

The GENEEC (GENeric Estimated Environmental Concentration) model (Version 2, 2007), was issued by the USEPA Office of Pesticide Programs (OPP) Environmental Fate and Effects Division (EFED) for use in Tier I, screening level pesticide aquatic ecological risk assessments.

GENEEC uses a the soil/water partition coefficient and degradation kinetic data to estimate runoff from a ten hectare field into a one hectare by two meter deep "standard" pond. It calculates acute as well as longer-term estimated environmental concentration (EEC) values. It considers reduction in dissolved pesticide concentration due to adsorption of pesticide to soil or sediment, incorporation, degradation in soil before wash-off to a water body, direct deposition of spray drift into the water body, and degradation of the pesticide within the water body. Tier I is used to screen chemicals to determine which ones potentially pose sufficient risk to warrant higher level modeling. Chemicals failing to pass this screen move on to the Tier II modeling.

GENEEC was designed to mimic a PRZM-EXAMS simulation, but is much simpler than the PRZM and EXAMS models in its treatment of hydrology. GENEEC is a single event model. It assumes one single large rainfall/runoff event occurs that removes a large quantity of pesticide from the field to the water all at one time. The linked PRZM and EXAMS models simulate the impact of daily weather on the treated agricultural field over a period of thirty years. During this time, pesticide is washed-off of the field into the water-body by twenty to forty rainfall/runoff events per year. Each new addition of pesticide to the water-body adds to the pesticide which has arrived earlier either through previous runoff events or through spray-drift and begins degrading on the day it reaches the water. Longer-term, multiple-day average concentration values are calculated based on the peak day value and subsequent values considering degradation processes.

Tier II estimated environmental concentrations (EECs) for myclobutanil were generated with standard crop [Table 9] scenarios using PRZM3 (version 3.12.2 compiled (05/11/05, Carsel, 1997) and EXAMS (version 2.98.04.06 compiled 04/24/05, Burns, 2002). PRZM simulates pesticide fate and transport as a result of leaching, direct spray drift, runoff and erosion from an agricultural field and EXAMS estimates environmental fate and transport of pesticides in surface water body (standard farm pond). The EECs assessment for surface water uses a single or multiple sites which typically represent a high-end exposure scenario from pesticide use on a particular crop or non-crop use site. PRZM and EXAMS were linked by the program (PE5, version 01 compiled 07/23/07).

Ground water concentrations were estimated using the Tier I screening model SCI-GROW (version 2.3, compile 08/08/03). Detailed description, documentation, and direct links for running these models can be found in:
http://www.epa.gov/oppefed1/models/water/index.htm.

The standard farm pond scenario is used to estimate EECs for ecological exposure. The pond scenario, represents a 10-ha corn (all cropped) field that is adjacent to a one hectare by two meter deep farm pond, which has neither hydraulic inlets nor outlets (i.e., pesticide cannot leave

by outflow). Weather and agricultural practices are simulated for 30 years so that the 10-year exceedence probability (1-in-10 year) at the site can be estimated. The simulation was generated using 30 years of meteorological data, encompassing the years from 1961 to 1990. Guidance for using the standard farm pond is located at: http://www.epa.gov/pesticides/trac/science/.

No PCA adjustment is required for the standard pond scenario and SCI-GROW.

b. Terrestrial Exposure Models

The focus of terrestrial wildlife exposure estimates is for birds (also acting as surrogate for reptiles and terrestrial-phase amphibians) and mammals with an exposure route emphasis on uptake through the diet. The residues in or on potential dietary sources for mammals and birds (e.g., vegetation, insects, and seeds) were estimated using the Tier I model T-REX (Version 1.3.1, 2006). In this Tier I assessment, it was assumed that organisms are exposed to one active ingredient in a given exposure scenario. In all screening-level assessments, the organisms are assumed to consume 100% of their diet as one food type. The T-REX output is listed in Appendix G.

The approach used to estimate exposure of terrestrial animals to myclobutanil was based on potential foliar applications of myclobutanil. Upper-bound exposure levels were calculated for spray applications of myclobutanil using maximum proposed application rates for one application for the proposed uses. The exposure estimates are based on a database of pesticide residues on wildlife food sources associated with specified application rates (Kenaga, 1972; Fletcher *et al.*, 1994). Essentially, for a single application, there is a linear relationship between the amount of pesticide applied and the amount of pesticide residue present on a given food item. Food item residue levels are then linearly adjusted based on application rate. The upper-bound estimates are used to estimate risks since these values represent the high-end exposure that may be encountered for terrestrial species that consume food items that have received label-specified pesticide application. Although these represent higher-end estimates, they do not represent the highest possible exposure estimates.

T-REX is a simulation model that, in addition to incorporating the relationship between application rate and food item residue concentrations, accounts for pesticide degradation in the estimation of EECs. T-REX calculates pesticide residues on each type of food item on a daily interval for one year. A first-order decay function is used to calculate the residue concentration at each day based on the concentrations present from both initial and all subsequent applications. The decay rate is dependent on the foliar dissipation half-life. The food item concentration on any given day is the sum of all concentrations up to that day, taking into account the first-order degradation. The initial application occurs on day 0 (t=0) and the model runs for 365 days. Over the 365-day run, the highest residue concentration is the measure of exposure (EEC) used to calculate RQs.

The foliar dissipation half-life and residue decline studies can be important in estimating exposure because they essentially determine how long the pesticide remains in or on food items

after application. In many cases, neither empirically determined foliar dissipation nor residue decline half-life (with a day 0 residue) values are available, in which case the default value of 35 days is used (Willis and McDowell, 1987). For myclobutanil, the default foliar dissipation half-life was used. Multiple residue decline and foliar dissipation studies are available; however, it is unclear as to whether or not these studies provide sufficient data to provide a foliar half-life for use in the terrestrial exposure model, T-REX. Therefore, T-REX was modeled using a default half-life of 35 days and for risk description purposes, a half-life of 2 days.

Table 6 summarizes the measures of ecological effects and exposure used to assess ecological risk following exposure to myclobutanil with the proposed uses.

Table 6. Measures of Ecological Effects and Exposure for Myclobutanil

Assessment Endpoint		Surrogate Species and Measures of Ecological Effect[1,2]	Measures of Exposure
Birds[3]	Survival	Bobwhite acute oral LD_{50}: 498 mg/kg bw Mallard subacute dietary LC_{50}: >4090 ppm	Maximum residues on food items (foliar)
	Reproduction and growth	Bobwhite reproduction NOAEC/LOAEC: 256/>256 ppm	
Mammals	Survival	Laboratory mouse acute oral LD_{50}: 1360 mg/kg	
	Reproduction and growth	Laboratory rat reproduction study NOAEC (NOAEL)/LOAEC (LOAEL): 200 ppm (16 mg/kg bw/day)/1000 ppm (80 mg/kg bw/day)	
Freshwater fish[4]	Survival	Bluegill sunfish 96-hr LC_{50}: 2.4 mg/L	Peak EEC[5]
	Reproduction and growth	Fathead minnow chronic (early life stage) NOAEC/LOAEC: 0.98/2.2 mg/L	60-day average EEC[5]
Freshwater invertebrates	Survival	Water flea 48-hr EC_{50}: 11 mg/L	Peak EEC[5]
	Reproduction and growth	Water flea chronic (life cycle) NOAEC/LOAEC: (no study available)	21-day average EEC[5]
Estuarine/marine fish	Survival	Sheepshead minnow 96-hr LC_{50}: 4.7 mg/L	Peak EEC[5]
	Reproduction and growth	Sheepshead minnow chronic (early life stage) NOAEC/LOAEC: (no study available)	60-day average EEC[5]
Estuarine/marine invertebrates	Survival	Eastern oyster 96-hr EC_{50}: 0.68 mg/L Mysid 96-hr EC_{50}: 0.24 mg/L	Peak EEC[5]

Table 6. Measures of Ecological Effects and Exposure for Myclobutanil			
Assessment Endpoint		Surrogate Species and Measures of Ecological Effect[1,2]	Measures of Exposure
	Reproduction and growth	Mysid chronic NOAEC/LOAEC: (no study available)	21-day average EEC[5]
Terrestrial plants[6]	Survival and growth	Monocot and dicot seedling emergence and vegetative vigor EC_{25}, EC_{05} and NOAEC values (no studies available)	Estimates of runoff and spray drift to non-target areas
Insects	Survival (not quantitatively assessed)	Honey bee acute contact LD_{50} (no study available). Dust study: > 100 µg/bee	Maximum application rate
Aquatic plants and algae	Survival and growth	Green algae 120-hr EC_{50}: 0.83 mg/L and NOAEC: 0.56 mg/L based on cell density. No study available for vascular plants	Peak EEC[5]

[1] LD_{50} = Lethal dose to 50% of the test population; NOAEC = No observed adverse effect concentration; LOAEC = Lowest observed adverse effect concentration; LC_{50} = Lethal concentration to 50% of the test population; EC_{50}/EC_{25} = Effect concentration to 50%/25% of the test population.

[2] If species listed in this table represent most commonly encountered species from registrant-submitted studies, risk assessment guidance indicates most sensitive species tested within taxonomic group are to be used for baseline risk assessments.

[3] Birds represent surrogates for amphibians (terrestrial phase) and reptiles.

[4] Freshwater fish may be surrogates for amphibians (aquatic phase).

[5] One in 10-year return frequency.

[6] Four species of two families of monocots - one is corn, six species of at least four dicot families, of which one is soybeans.

III. Analysis

A. Use Characterization

The myclobutanil labels considered in this assessment include RALLY® 40 WSP (EPA Reg. No. 62719-410) and NOVA® 40 W and RALLY® 40 W (EPA Reg. No. 62719-411). Myclobutanil will be used to control powdery mildew on Fruiting Vegetables (Crop Group 8), leafy vegetables (Crop Subgroup 4A), artichokes, and disease in tropical fruits. The proposed methods of myclobutanil application are through ground and aerial spray as well as sprinkler irrigation (chemigation).

The rates proposed for each crop (crop group) are given in Table 7. The individual application rates range from 0.10 to 0.25 lb a.i./A. The number of applications range from 4 to 8; the minimum reapplication interval ranges from 10 to 14 days. The maximum proposed rate is for tropical fruit is 0.25 lb a.i./A per application with a maximum seasonal application rate of 2.0 lb a.i./A with a minimum reapplication interval of 14 days. The maximum application rate and number of applications is proposed for the tropical fruit use.

Table 7. Proposed new uses and use patterns of myclobutanil (PC 128857 D336613)					
Supplemental Product Label	**Reg. No.**	**Use Restriction**	**New Use – Crop Groups, Crops**	**Max # Appl. /Interval**	**Rate/Season[1] Rate**
Petition 6E7138					
Rally 40 WSP	62719-410	None	Tropical fruits[2]	8/14	0.25/2.0
Rally 40 WSP	62719-410	None	Okra	4/10 to 14	0.125/0.50
Rally 40 WSP	62719-410	None	Crop Group 8[3]; Pepper, Eggplant	4/10 to 14	0.125/0.50
Rally 40 WSP	62719-410	None	Artichoke	6/14	0.10/0.60
Rally 40 WSP	62719-410	None	Crop subgroup 4A[4] Head & Leaf lettuce; FL, - 3 crops/year[1]	4/14 3[1] x 4/14	0.125/0.50 0.125/1.50
Petition 3E6562					
Nova 40 W	62719-411	Not for use in[5]	Okra	4/10 to 14	0.125/0.50
Nova 40 W	62719-411	Not for use in[5]	Crop Group 8[3]; Pepper, Eggplant	4/10 to 14	0.125/0.50
Rally 40 W [Product label]	62719-411	For use only in[6]	Tropical fruits[2]	8/14	0.25/2.0

[1] Number of seasons per year is not defined; as many as 3 crops from the same ground in Florida (communication B. Madden, 08-24-07).

[2] Tropical fruits; Black Sapote, Canistel, Mamey Sapote, Mango, Papaya Sapodilla, and Star Apple

[3] Crop group 8 Fruiting vegetables – Peppers and Egg Plant [6E7138], except tomatoes; leafy vegetables

[4] Crop subgroup 4A, Leafy vegetables. except tropical fruits, spinach; artichoke, cilantro, and okra. (Amaranch, Arugula, chervil, garland, chrysanthemum, corn salad, garden cress, upland crass, dandelion, dock, endive, lettuce, orach, parsley, garden purslane, and winter purslane, radicchio, and Cilantro).

[5] Not for use in AK, AZ, CA, HI, ID, MT, NV, OR, UT, WA, WY

[6] For use only in AK, ID, MT, NV, OR, UT, WA, WY (D336254).

Label Uncertainty

The labels do not define whether "per season" means that only one crop may be grown from a given field in a year (or more than 1 crop cycle per year is possible which infers multiple seasons or crops per year). According to IR-4 sources, as many as three crops of lettuce may be grown from the same ground per year in Florida (communication from B. Madden, 08-24-07). The remaining uses assume only 1 season per year.

Two sets of draft labels were submitted to EFED. The first set of labels for RALLY® 40 WSP has geographic use restrictions, the second set does not. The labels for NOVA® 40 W also had geographic restrictions (precluded use in AK, AZ, CA, HI, ID, MT, NV, OR, UT, WA, and WY). The geographic restrictions on the NOVA® 40 W and RALLY® 40 WSP labels does not appear to agree with the proposed new uses. The draft Rally 40 WSP labels restricts its use to AK, ID, MT, NV,OR, UT, WA, and WY and the Nova 40 W label precludes its use in 11 states,

including AZ, CA, and HA, yet the proposed new use is tropical fruit. The confusion in the labs should be addressed.

B. Exposure Characterization

1. Environmental Fate and Transport Characterization

Our understanding of the environmental fate and transport properties of myclobutanil is based on a sparse data set. Available environmental fate parameters, including the chemical structure of myclobutanil are listed in Table 8. These data are based on studies that may not be acceptable under current classification standards as they were conducted prior to 1986 before Good Laboratory Practice (GLP) standards (40 CFR 160) and data requirements for registration were promulgated in the Code of Federal Regulations (40 CFR 158). Therefore, the Agency assumes that the residues of concern are persistent (stable) in soil and water for the exposure assessment. The previously submitted studies have not been re-reviewed, although rate of degradation (decline) of myclobutanil in the aerobic soil metabolism study was re-estimated.

Due to its persistence and mobility, the primary routes of dissipation are through leaching, runoff, and spray drift. Myclobutanil is stable to hydrolysis and to photolysis. Myclobutanil degradation is controlled by microbial-mediated transformations. Myclobutanil was moderately persistent to persistent (DT_{50} > 70 days) in aerobic soils and persistent in anaerobic soils. The major degradation products observed in the aerobic soil metabolism (ASM) studies were 1,2,4-triazole (maximum 18%), CO_2, a polar degradate (β-4-chlorophenyl-β-cyano-γ-(1H-1,2,4-triazole)-butyric acid; maximum 9 %), and unextractable residues. At the conclusion of the 367 day ASM study, 29 to 33 percent of the applied radioactivity remained as parent myclobutanil and 13 percent was identified as 1,2,4-triazole.

Myclobutanil degradation in the ASM studies does not appear to follow first-order kinetics based upon visual inspection, but follows a "hockey stick" degradation pattern (a rapid initial decline followed by a slower decline), thus the first-order half-life does not accurately describe the decline of myclobutanil residues. The observed (visible inspection) aerobic metabolism DT_{50} for myclobutanil value ranged between 75 and 90 days. The DT_{90} for myclobutanil was not reached during the course of the study (367 days). Once the maximum level of 1,2,4-triazole is reached, its decline pattern parallels myclobutanil. The decline of the combined residues also followed the hockey stick pattern. Terrestrial field dissipation half-life values ranged from 92 to 292 days. Myclobutanil photo-degrades with a half-life of approximately 143 days on soil. Thus, myclobutanil residues are fairly persistent. The potential for accumulation in soil is possible due to the persistence, especially when there are multiple applications. Further discussion is provided in Section 2.a. Aquatic Exposure Modeling and Appendix B.

Myclobutanil is mobile as indicated by the Freundlich K_{ads} values (from 1.46 to 9.77 mL/g) (Appendix B, Table 3). The lowest non-sand value is 2.39 mL/g. Desorption coefficients were generally less than the sorption coefficients. The degradate (1,2,4-triaziole) has lower Freundlich K_{ads} values (0.234 to 0.833 mL/g), suggesting it would be more mobile than the parent compound (Appendix B, Table 4). The sorption is not strongly correlated to soil organic carbon (matter), thus Koc is not a good measure of mobility for modeling.

Because log K_{ow}s for parent and degradation products are low (log K_{ow}= 2.94), the myclobutanil residues are not expected to bioaccumulate (MRID # 00162541).

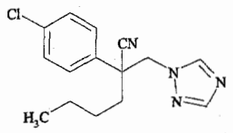
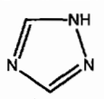
Table 8. Selected Fate and Transport data for myclobutanil and 1,2,4-triazol.		
Parameter	**Input Value and Unit**	**Source**
Chemical Formula **Myclobutanil: alpha-butyl-alpha (4-chlorophenyl)-1H-1,2-triazole-1-propane-nitrile**		
Chemical Structure: **Myclobutanil**		
Myclobutanil Molecular Weight	288.8 g/ mol	DP Barcode D289700 (6/25/03)
Solubility in water (pH 7, 20°C)	142 mg/L	DP Barcode D289700 (6/25/03)
161-1 Hydrolysis at pH 5,7, and 9	Stable	MRID 00141679
161-2 Aqueous photolysis ($t_{1/2}$)	Stable	MRID # 40641501, 40319801, 40528801
161-3 Soil Photolysis	143 days	MRID # 00164988 (D197478)
163-1 Partition Coefficient, K_{ads} [a]	1.46, 2.39, 4.44, 7.08, 9.77 mL/g	MRID# 00141682
162-1 Aerobic Soil Metabolism (T½)[b]	198, 224 days	MRID# 00164561
162-3 Anaerobic Soil Metabolism	Assume Stable, No appreciable degradation in 62 days	DP Barcode D289700 (6/25/03)
162-3 Anaerobic Aquatic Metabolism	No Data Submitted	
162-4 Aerobic Aquatic Metabolism	No Data Submitted	
164-1 Terrestrial field dissipation	92 to 292 days	MRID # 00164563
Chemical Structure: **Primary Degradation Product** **1,2,4-Triazole**		
1,24-Triazole Molecular weight:	69.07	DP Barcode D289700 (6/25/03)
163-1 Partition Coefficient, K_{ads} [a] 1,2,4 Triazole	0.234, 0.719, 0.722, 0.748, 0.833	MRID# 40891501
162-1 Aerobic Soil Metabolism (T½)[b]	315 days	MRID# 00164561

Table 8. Selected Fate and Transport data for myclobutanil and 1,2,4-triazol.		
Parameter	**Input Value and Unit**	**Source**
Myclobutanil plus 1,2,4 Triazole		

[a] Koc are presented in Appendix B, Tables 3 and 4.

[b] (T½) – Myclobutanil decline does not follow first-order kinetics, therefore the decay rate is not a half-life. Estimate of DT_{50} dependant upon method used to determine value.

2. Measures of Aquatic Exposure

a. Aquatic Exposure Modeling

Pesticide usage information was obtained from the draft labels. Tier I GENEEC2 modeling was conducted to provide national-scale screening concentrations for myclobutanil. Tier II PRZM/EXAMS modeling was conducted to provide regional-scale screening concentrations for specific crops. Because Tier II modeling scenarios for artichokes, okra, and tropical fruit are not available in the standard PRZM scenarios, surrogate scenarios were selected to represent these crops and their predominate productions areas in United States (Table 9)

Table 9. PRZM/EXAMS Surrogate Scenarios Used in the Aquatic Exposure Assessment		
Crop	**Surrogate Scenario**	**Rationale for Surrogate Scenario**
Artichokes	CA row crop	Scenario used as surrogate in Red-Legged Frog Endangered Species Assessments CA accounts for all artichoke production (www.hort.purdue.edu/rhodcv/hort410/lettuc/le00005.htm)
Okra	FL tomato CA tomato	Okra production is concentrated in TX, GA, FL, CA, TN, and AL (http://www.aces.edu/pubs/docs/A/ANR-0959/)
Tropical Fruits	PR coffee FL avocado LA sugarcane CA citrus	Selected a range of scenarios to represent the region for tropical fruit production in the United States

Model input parameters were estimated from the fate and transport properties and the other default values were selected as recommended by EFED Input Guidance document (USEPA, 2002) (Table 10).

Table 10. Input parameters for the Tier I GENEEC2 and Tier II PRZM/EXAMS models used in the Myclobutanil Aquatic Exposure Assessment		
Input	**Value**	**Rationale**
Application rate/number/interval	0.25 lb a.i.A^{-1} /8/14 days	Maximum proposed label use
Incorporation depth	0	USEPA, 2002
Hydrolysis	0 (stable)	USEPA, 2002
Aquatic Photodegradation	0 (stable)	USEPA, 2002
Solubility	142.0 mg/L	USEPA, 2002
Aerobic Soil Metabolism Myclobutanil Myclobutanil + 1,2,4-triazole	 251 days 315 days	 Upper 90th bound on mean 0nly 1 value
Aerobic Aquatic Metabolism Myclobutanil Myclobutanil + 1,2,4-triazole	 *Estimated as* 502 days *Estimated as* 630 days	 2 x ASM per USEPA, 2002 2 x ASM per USEPA, 2002
Anaerobic Aquatic Metabolism	Stable	Assumed stable to be conservative
Mobility (Freundlich K_{ads}) Myclobutanil 1,2,4-triazole	 2.39 mL/g 0.719 mL/g	 Lowest non-sand value Lowest non-sand value
Aerial Spray Drift Ground Spray Drift	0.05 (fraction) 0.01 (fraction)	USEPA, 2002

Tier I myclobutanil peak EECs range from 22.3 to 82.9 µg/L (Table 11). The highest concentrations were associated with the tropical fruit use regardless of the range of available environmental fate data. This crop use allows a maximum application rate of 0.25 lb a.i./A with 8 application at 14 day intervals. As expected, chronic concentrations (i.e., 21-day average and 60 day-average) are comparable to the peak concentration because of the persistent nature of myclobutanil in aquatic and soil environments.

Table 11. Myclobutanil EECs generated by GENEEC2 for different proposed use rates and assumption about environmental fate data used as model inputs.					
Crops	Rate/no./Inv[a].	K_{ads}/ASM/AAQ[b]	Peak	21-day	60-day
			µg/L		
Tropical Fruit (Aerial Spray)	0.25/8/14	2.4/251/0	82.9	82.3	81.0
		2.4/251/502	82.3	81.0	78.6
Okra (Aerial Spray)	0.125/4/10	2.4/251/0	22.4	22.2	21.8
		2.4/251/502	22.3	21.9	21.3
Lettuce[c] (Aerial spray)	0.125/12/14	2.4/251/0	58.6	58.1	57.2
		2.4/251/502	56.4	55.5	53.8
Artichoke (Aerial Spray)	0.10/6/14	2.4/251/0	25.6	25.4	25.0
		2.4/251/502	25.5	25.1	24.4

[a] Rate/no./Inv. = application rate lb ai/A; number applications per year; reapplication interval
[b] K_{ads} Freundlich K_{ads} (mL/g), ASM = aerobic soil metabolism, AAQ = aerobic aquatic metabolism
[c] Lettuce; three crops per season, 4 applications per crop for a total of 12 per year

Because the GENEEC2 EEC exceeded aquatic organism toxicity LOCs, Tier II PRZM EXAMS modeling was conducted to refine the exposure assessment for both myclobutanil and myclobutanil plus 1,2,4-triazole (combined residues). The combined residues would provide an upper bound exposure estimate because of the conservatism of the half-life and sorption (K_{ads}) selected for modeling. The influence the method of application (ground versus aerial spray) was also evaluated.

One in ten year Tier II myclobutanil peak EECs range from 3.4 to 183.9 µg/L and for myclobutanil plus 1,2,4-triazole range from 5.0 to 202.7 µg/L (Table 12). The highest peak concentration (183.9 and 202.7 µg/L) is associated with the tropical fruit use in LA.

Table 12: Myclobutanil and Myclobutanil + 1,2,4-triazole EECs from Tier II PRZM/EXAMS Simulations.					
Crops	Rate /No./Inv[2]	Method	1 in 10 year EEC[1] (µg/L)		
			Peak	21 day Average	60 day Average
CA-Artichoke	0.10/6/14	Aerial	18.2 [20.7]	18.1 [20.6]	18.0 [20.5]
		Ground	12.5 [23/5]	12.4 [13.4]	12.3 [13.4]
CA Lettuce	0.125/12/14	Aerial	105.9 [117.0]	105.9 [116.9]	105.9 [116.0]
		Ground	95.8 [103.9]	95.5 [103.0]	95.1 [102.9]
CA-Okra	0.125/4/10	Aerial	6.7 [8.6]	6.6 [8.5]	6.4 [8.3]
		Ground	3.4 [5.0]	3.4 [4.9]	3.3 [4.9]
FL-Okra		Aerial	19.7 [17.2]	19.5 [17.0]	19.2 [16.8]
		Ground	17.6 [14.2]	17.3 [14.1]	17.0 [13.9]
PR-Tropical Fruit	0.25/8/14	Aerial	99.1 [107.5]	97.9 [107.4]	96.5 [105.5]
		Ground	95.1 [102.3]	93.9 [101.3]	91.9 [99.4]
FL-Tropical Fruit		Aerial	20.4 [20.9]	20.0 [20.6]	19.8 [20.3]
		Ground	10.5 [8.0]	10.4 [8.0]	10.2 [7.9]
LA-Tropical Fruit		Aerial	183.9 [202.7]	181.0 [201.6]	179.8 [197.8]
		Ground	178.7 [194.8]	175.9 [192.8]	174.6 [189.9]
CA-Tropical Fruit		Aerial	22.42 [28.0]	22.2 [27.8]	22.0 [27.5]
		Ground	10.3 [12.3]	10.3 [12.3]	10.1 [12.1]

[1] Myclobutanil [combine -Myclobutanil plus 1,2,4-triazole]

[2] Rate lb a.i./A / number of applications / interval between applications in days

Additional inspection of the Tier II EECs indicates year-to-year accumulation of myclobutanil in the standard pond (Figure 3). This accumulation is not unexpected due to the persistence of myclobutanil in soil and water environments, and the lack of inflow and outflow in the standard pond that precludes decreases in concentrations of residues due to dilution.

Outputs from the scenarios modeled are included in Appendix C.

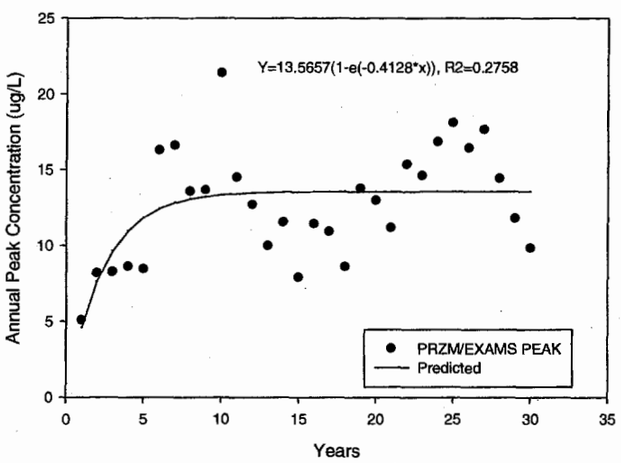


Figure 3: Accumulation of PRZM/EXAMS Annual Peak Concentrations of Myclobutanil in the Florida Tomato Scenario (surrogate for FL Okra ground spray use).

This apparent accumulation limits any probabilistic interpretation of the return frequency of concentrations. Therefore, the 1-in-10 year concentrations reported in the standard EFED ecological risk assessments are highly conservative because they represent accumulation over approximately 27 years. Modeling of accumulation curves was conducted to allow for estimation of concentrations during a 30 year time period. The modeling was conducted on annual peak concentrations from PRZM/EXAMS using Sigmaplot Regression Wizard. The model used was the exponential rise to maximum model ($y=a(1-e^{(-b*x)})$) where y= annual peak concentration (µg/L), x = time (years), a= plateau concentration of accumulation, and b= annual rate of rise ($year^{-1}$). Table 13 shows the model parameters resulting from for each PRZM/EXAMS simulation.

Table 13: Time (years) to reach plateau concentration in standard farm pond.				
Scenario	Application Method	Model Predicted Constants		R^2
		A^x	B^y	
FL Okra	Air	15.9224	0.4158	0.36
	Ground	13.5657	0.4128	0.28
CA Okra	Air	6.1507	0.3930	0.87
	Ground	2.7613	0.4002	0.55
CA Lettuce	Air	92.2632	0.2393	0.76
	Ground	81.2336	0.2454	0.69
CA Artichoke	Air	17.3965	0.2297	0.94
	Ground	11.4516	0.2403	0.87
CA Tropical Fruit	Air	21.2216	0.4957	0.72
	Ground	7.6581	0.7555	0.15
FL Tropical Fruit	Air	17.5039	0.3531	0.38
	Ground	7.2592	0.2057	0.10
LA Tropical Fruit	Air	164.8421	0.2902	0.67
	Ground	158.0310	0.2870	0.64
PR Tropical Fruit	Air	98.3949	0.0642	0.4915
	Ground	142.1702	0.0295	0.5250

[x] Years to reach plateau concentration in standard farm pond.
[y] Annual rate of rise ($year^{-1}$).

b. Aquatic Exposure Monitoring and Field Data

Monitoring studies which included myclobutanil as an analyte were the USGS NAWQA; USDA, Pesticide Data Program (PDP); and the Reservoir Pilot Monitoring Program (USGS, 2001). The Pesticide Data Program (PDP) and Reservoir Pilot Monitoring Program (USGS, 2001) studies were located at drinking water treatment facilities. The monitoring studies were not specifically targeted to myclobutanil use areas.

USDA, Pesticide Data Program (PDP)

The PDP is a program implemented by the USDA in 1991 to test commodities in the U.S. food supply for pesticide residues (2001). Sampling of finished drinking water was not added until 2001. The PDP is a partner ship with cooperation State Agencies responsible for sample collection and analysis of fresh and processed fruit and vegetables, grain, grain products, milk and dairy products, beef, pork, drinking water, and bottle water. Ten to twelve states participate in PDP program. In 2005, the twelve states were CA, CO, FL, MD, MI, MN, MT, NY, OH, TX, WA, and WI.

Paired samples of raw (untreated) intake and disinfected finished (treated) water were collected for analysis by the PDP in 2004 and 2005. Treated water samples were collected after the untreated samples at a time interval consistent with the hydraulic residence time. The

frequency of myclobutanil detections was 2 percent for the treated water and 1 percent for the untreated water (Table 14) in the 2005 samples. There were no detections in any of the other years. Triazoles and its conjugates were detected in several food commodities, but not in water samples in the PDP study.

Table 14. Distribution of myclobutanil and 1,2,4-triazole residues in drinking water in the USDA Pesticide Data Program (PDP) (USDA, 2001 - 2006).

Myclobutanil	No. of Samples	No. of Detects (year)	% samples with detection	Range of Detections[1] (µg/L)	Range of LODs[2] (µg/L)
Finished (treated)	288	0 (2001)	0	0	0.0113-0.10
Finished (treated)	582	0 (2002)	0	0	0.005-0.020
Finished (treated)	782	0 (2003)	0	0	0.005-0.020
Finished (treated)	380	0 (2004)	0	0	0.0013 – 0.0113
Unfinished (untreated)	381	0 (2004)	0	0	0.0013 – 0.0113
Finished (treated)	230	4 (2005)	1.7	0.019	0.0050 – 0.0113
Unfinished (untreated)	232	2 (2005)	0.9	0.019	0.0050 – 0.0113

[1] Only one distinct detected concentration or LOD value was reported for the pair.
[2] LOD is Limit of detection.

Reservoir Pilot Monitoring Program (USGS, 2001)

Myclobutanil was included in a study that monitored a number of water supply reservoirs and finished water (USGS, 2001). Residues were detected at low concentrations in about 1 percent of 317 samples of raw water, with no detections in the finished water (Table 15). The degradation products were not included.

Table 15. Myclobutanil results from the summary of analysis of moderate-use pesticides and degradates in water samples from water supply intakes and finished-supply taps in Reservoir Pilot Monitoring Program. (USGS, 2001).

	No. of Samples	No. of Detections (Quantifiable No. of Detections)	Frequency of Detection (%)	Maximum Detection (µg/L)	Method Reporting Level (µg/L)
Raw Water	317	3 (2)	0.9	0.015	0.008
Finished Water	221	0	0	0	0.008

USGS NAWQA (National Water Quality Assessment Program)

The USGS. NAWQA data was downed load on 09/25/07 (http://ca.water.usgs.gov/pnsp/ http://waterdata.usgs.gov/nwis/qw) and "contained data through water year 2006".

Surface Water Analysis

Myclobutanil was detected in ambient surface water (Table 16) at a detection frequency of 20.4 % (541 of 2647 samples). The maximum daily myclobutanil concentration was 0.507 µg/L for a sampling site located (USGS Sampling Station # 2335870) in Cobb County, GA. Land use in the Cobb County, GA watershed is designated as urban. The maximum average myclobutanil concentration was 0.347 µg/L for a sampling site (USGS Sampling Station # 3730112120393401) located in Merced County, CA. The minimum reporting limit (MRL) varies from 0.0022 to 0.25 µg/L, with a median MRL of 0.008 µg/L (Appendix C).

Table16: Distribution of Myclobutanil Concentrations in USGS NAWQA Surface Water Monitoring Data Monitoring Data (2002-2006).

Exposure Value	Detects (%)	Percentile								
		Max	99.9	99	95	90	80	70	60	50
Peak	20.4	0.507	0.486	0.344	0.074	0.033	0.033	0.033	0.010	0.008
Average		0.347	0.320	0.149	0.033	0.020	0.014	0.011	0.008	0.008

Ground Water Analysis

Myclobutanil was detected in ground water (Table 17) at a detection frequency is 0.15% (3 of 2061 samples). Myclobutanil was detected in three wells. The maximum concentration is 0.0338 µg/L for a well (USGS Sampling Station # 295358095374101) located in Harris County, TX. Land use in the Harris County recharge zone is designated as urban. The minimum reporting limit (MRL) varies from 0.0022 to 0.033 µg/L with a median MRL of 0.008 µg/L.

Table17: Distribution of Myclobutanil Concentrations in USGS NAWQA Ground Water Monitoring Data Monitoring Data

Station ID	Concentration (µg/L)	Well Description
295358095374101	0.0338	Harris County, TX; Well Depth 33.5 ft: Urban Land Use
322237086112101	0.0208	Montgomery County, AL; Well Depth 31.5 ft; Urban Land Use
465509119371501	0.0079	Grant County, Washington; Well Depth 15 ft; Ag Land Use

3. Measures of Terrestrial Exposure

a. Terrestrial Exposure Modeling

Exposure of free-ranging terrestrial animals is a function of the timing and extent of pesticide application with respect to the location and behavior of those species. OPP's terrestrial exposure model generates exposure estimates assuming that the animal is present on the use site at the time that pesticide levels are highest. The upper-bound pesticide residue concentration on food items is calculated from both initial applications and any additional applications, taking into account pesticide degradation between applications. Although this approach is conservative, it is reasonable, particularly when considering acute risks. For acute risks, the assumption is that the duration of exposure is a single day and, again, occurs when residue levels are highest. In evaluating chronic risks, longer-term exposure estimates are also based on the assumption that the animal is present on the use site when residue levels are highest and furthermore that it repeatedly forages on the use site although the frequency and duration of foraging events on the use site are not explicitly considered or specified.

The current screening-level approach does not directly relate timing of exposure to critical or sensitive population, community, or ecosystem processes. Given that the application timing and location is crop-dependent, it is difficult to address the temporal and spatial co-occurrence of myclobutanil use and sensitive ecological processes. However, pesticides are frequently used from spring through fall; crop cultivation frequently starts in the spring, hence uses of myclobutanil are likely to occur in spring and perhaps summer. Spring and early summer are typically seasons of active migrating, feeding, and reproduction for many wildlife species. The increased energy demands associated with these activities (as opposed to hibernation, for example) can increase the potential for exposure to pesticide-contaminated food items since agricultural areas can represent a concentrated source of relatively easily obtained, high-energy food items. In this assessment, the spatial extent of exposure for terrestrial animal species is limited to the use area only and the area immediately surrounding the use area.

Currently, the Agency does not require toxicity studies on reptiles and amphibians in support of pesticide registrations. To accommodate this data gap, birds are used as surrogates for terrestrial-phase amphibians and reptiles. It is assumed that, given the usually lower metabolic demands of reptiles and amphibians compared to birds, exposure to birds would be greater due to higher relative food consumption. While this assumption is likely true, there are no supported relationships regarding the relative toxicity of a compound to birds and herpetofauna. The lack of toxicity data on reptiles and amphibians represents a source of uncertainty in this assessment.

Tables 18a and 18b list selected predicted EECs for birds, reptiles, terrestrial amphibians, and mammals obtained from T-REX simulations for all proposed uses of myclobutanil at the maximum label rates.

Table 18a. Terrestrial Food-Item Residue Estimates for Birds With Myclobutanil Proposed Uses Assuming a Foliar Dissipation Half-life of 35 Days.

Crop	Application Rate (lb a.i./A) No. Applications/season Application interval (days)	Food Item	Maximum Dose-Based EECs (mg/kg)[1]	Dietary-Based EECs
Tropical Fruit	0.25 8 14	Short grass	251.5	220.82
		Tall grass	115.27	101.21
		Broadleaf plants/ small insects	141.47	124.21
		Fruits, pods, seeds, lg. insects	15.72	13.8
Okra and other Crops	0.125 4 10	Short grass	104.05	91.36
		Tall grass	47.69	41.87
		Broadleaf plants/ small insects	58.53	51.39
		Fruits, pods, seeds, lg. insects	6.50	5.71
Lettuce	0.125 10 8	Short grass	151.17	132.73
		Tall grass	69.29	60.84
		Broadleaf plants/ small insects	85.03	74.66
		Fruits, pods, seeds, lg. insects	9.45	8.30
Artichokes	0.10 6 14	Short grass	91.50	80.34
		Tall grass	41.94	36.82
		Broadleaf plants/ small insects	51.47	45.19
		Fruits, pods, seeds, lg. insects	5.72	5.02

[1]Based on 20 gram birds (acute)

Table 18b. Terrestrial Food-Item Residue Estimates for Mammals With Myclobutanil Proposed Uses Assuming a Foliar Dissipation Half-life of 35 Days.

Crop	Application Rate (lb a.i./A) No. Applications/season Application interval (days)	Food Item	Maximum Dose-Based EECs (mg/kg)[1]	Dietary-Based EECs
Tropical Fruit	0.25 8 14	Short grass	210.5	220.82
		Tall grass	96.50	101.21
		Broadleaf plants/ small insects	118.43	124.21
		Fruits, pods, seeds, lg. insects	13.16	13.8
		Granivore	2.92	N/A
Okra and other Crops	0.125 4 10	Short grass	87.10	91.36
		Tall grass	39.92	41.87
		Broadleaf plants/ small insects	49.00	51.39
		Fruits, pods, seeds, lg. insects	5.44	5.71
		Granivore	1.21	
Lettuce	0.125 10 8	Short grass	126.55	132.73
		Tall grass	58.00	60.84
		Broadleaf plants/ small insects	71.18	74.66
		Fruits, pods, seeds, lg. insects	7.91	8.30
		Granivore	1.76	N/A
Artichokes	0.10	Short grass	76.59	80.34

Table 18b. Terrestrial Food-Item Residue Estimates for Mammals With Myclobutanil Proposed Uses Assuming a Foliar Dissipation Half-life of 35 Days.				
Crop	Application Rate (lb a.i./A) No. Applications/season Application interval (days)	Food Item	Maximum Dose-Based EECs (mg/kg)[1]	Dietary-Based EECs
	6 14	Tall grass	35.11	36.82
		Broadleaf plants/ small insects	43.08	45.19
		Fruits, pods, seeds, lg. insects	4.79	5.02
		Granivore	1.06	N/A

[1]Based on 15 gram mammals (acute)

b. Residue Studies

As stated previously, multiple residue decline and foliar dissipation studies are available; however, it is unclear as to whether or not these studies provide sufficient data to provide a foliar half-life for use in the terrestrial exposure model, T-REX (Version 1.3.1). Therefore, T-REX was modeled using the default half-life of 35 days and to provide an estimate assuming rapid dissipation in/on food items, for risk description purposes, a half-life of 2 days.

C. Ecological Effects Characterization

1. Aquatic Effects Characterization

a. Aquatic Animals

(1) Acute Effects

Freshwater Fish and Aquatic-Phase Amphibians

Table 19. Freshwater Fish Acute Toxicity Data.					
Common Name	**%AI**	**Study parameters**	**LC_{50}/NOAEC/LOAEC**	**MRID**	**Classification/ Category**
Bluegill sunfish *Lepomis macrochirus*	84.5	96 hour study 10 fish/vessel 0, 0(solvent), 0.84, 1.5, 2.7, 4.7, 8.4 mg/L Static study	96 HR LC_{50}=**2.4 (1.5-4.7) mg/L**[2,3]. NOAEC = 1.5 mg/L LOAEC = 2.7 mg/L based on quiescence, loss of equilibrium and death.	00144285	Acceptable Moderately toxic[1]

Table 19. Freshwater Fish Acute Toxicity Data.					
Common Name	**%AI**	**Study parameters**	**LC_{50}/NOAEC/LOAEC**	**MRID**	**Classification/ Category**
Rainbow trout *Onchorhynchus mykiss*	84.5	96 hour study 10 fish/vessel 0, 0(solvent), 1.0, 1.8, 3.2, 5.6, 10 mg/L Static study	96 HR LC_{50}=4.2 (3.2-5.6) mg/L NOAEC = 1.8 mg/L LOAEC = 3.2 mg/L (loss of equilibrium, surfacing and dark coloration). Mortality observed at 5.6 mg/L and above.	00141677	Acceptable Moderately toxic[1]

[1]Based on LC_{50} (mg/L): < 0.1 very highly toxic; 0.1-1 highly toxic; >1-10 moderately toxic; >10-100 slightly toxic; >100 practically nontoxic
[2] **Bold** value is the value that will be used to calculate risk quotients
[3] Range is 95% confidence interval for endpoint

Freshwater Invertebrates

Table 20. Freshwater Invertebrates Acute Toxicity Data					
Common Name	**%AI**	**Study parameters**	**EC_{50}/NOAEC/LOAEC**	**MRID**	**Classification/ Category**
Water flea *Daphnia magna*	84.5	48 hour study 20 inverts/conc. level 0, 0(solvent), 1.8, 3.2, 5.6, 10, 18 mg/L Static study	48 HR EC_{50} =**11 (9.5-13) mg/L**[2,3]. Slope = 6.83 (4.1 – 9.6) NOAEC = 10 mg/L LOAEC = 5.6 mg/L (settled to the bottom). Mortality observed at 10 mg/L and above.	00141678	Acceptable Slightly toxic[1]

[1]Based on EC_{50} (mg/L): < 0.1 very highly toxic; 0.1-1 highly toxic; >1-10 moderately toxic; >10-100 slightly toxic; >100 practically nontoxic
[2] **Bold** value is the value that will be used to calculate risk quotients
[3] Range is 95% confidence interval for endpoint

Marine/Estuarine Fish

Table 21. Estuarine/Marine Fish Acute Toxicity Data					
Common Name	**%AI**	**Study parameters**	**LC_{50}/NOAEC/LOAEC**	**MRID**	**Classification/ Category**
Sheepshead minnow *Cyprinodon variegatus*	93	96-hour study 20 fish/conc. Level 0, 0(solvent), 1.2, 1.8, 2.3, 3.8, 6.3 mg/L (mean measured) Flow-through study	96 HR LC_{50} =**4.7 (3.8-6.3) mg/L**[2,3]. NOAEC = 1.2 mg/L LOAEC = 1.8 mg/L (errative hebanior, darkened pigmentation, lethargy; fish at higher concentration levels also exhibited partial loss of equilibrium and rapid respiration). Mortality observed at 3.8 mg/L and above.	42747903	Acceptable Moderately toxic[1]

[1]Based on LC_{50} (mg/L): < 0.1 very highly toxic; 0.1-1 highly toxic; >1-10 moderately toxic; >10-100 slightly toxic; >100 practically nontoxic

[2] **Bold** value is the value that will be used to calculate risk quotients

[3] Range is 95% confidence interval for endpoint

Marine/Estuarine Invertebrates

Table 22. Estuarine/Marine Invertebrate Acute Toxicity Data					
Common Name	**%AI**	**Study parameters**	**EC_{50}/NOAEC/LOAEC**	**MRID**	**Classification /Category**
Eastern oyster *Crassostrea virginica*	93	96-hour study 40 oysters/conc. level 0, 0(solvent), 0.091, 0.16, 0.29, 0.48, 0.78 mg/L (mean measured) Flow-through study	96 HR EC_{50} =**0.68 (0.64-0.73) mg/L**[2,3]. Slope = 2.09 (-0.8 – 5.0) NOAEC = 0.48 mg/L LOAEC = 0.78 mg/L (shell deposition). Inadequate shell growth in controls may mask pesticide related shell growth effects.	42747901	Supplemental Highly toxic[1]

Table 22. Estuarine/Marine Invertebrate Acute Toxicity Data					
Common Name	**%AI**	**Study parameters**	**EC_{50}/NOAEC/LOAEC**	**MRID**	**Classification /Category**
Mysid *Mysidopsis bahia*	93	Two 96-hour studies 20 mysids/conc. Level 0, 0 (solvent), 180, 260, 410, 550, 1000 µg/L (first study); 0, 0 (solvent), 34, 43, 78, 110, 200 µg/L (second study) (mean measured) Flow-through study	96-HR LC_{50} = **0.24 (0.20 – 0.27) mg/L.** Slope = 6.4 Precise LC_{50} could not be determined in second study NOAEC could not be determined in first study. NOAEC = 0.043 mg/L from second study LOAEC = 0.078 mg/L (mortality; sublethal effects observed at levels where mortality was observed – lethargy, darkened pigmentation).	42747902	Acceptable Highly toxic

[1]Based on EC_{50} (mg/L): < 0.1 very highly toxic; 0.1-1 highly toxic; >1-10 moderately toxic; >10-100 slightly toxic; >100 practically nontoxic
[2] **Bold** value is the value that will be used to calculate risk quotients
[3] Range is 95% confidence interval for endpoint

(2) Chronic Effects

Freshwater Fish

Table 23. Freshwater Fish Chronic Toxicity Data					
Common Name	**%AI**	**Study parameters**	**NOAEC/LOAEC**	**MRID**	**Classification /Category**
Fathead minnow *Pimephales promelas*		Early life stage 0, 0 (solvent), 0.45, 0.98, 2.2, 4, 8.5 mg/L tested	**0.98 mg/L**[1] Early life LOAEC=2.2 mg/L Total mortality at 8.5 mg/L.	00164986 40409201 40480401	Acceptable

[1] **Bold** value is the value that will be used to calculate risk quotients

Freshwater Invertebrates

There are currently no chronic freshwater invertebrate studies available for myclobutanil.

Estuarine/Marine Fish

There are currently no chronic estuarine/marine fish studies available for myclobutanil.

Estuarine/Marine Invertebrates

There are currently no chronic estuarine/marine invertebrate studies available for myclobutanil.

(3) Field Studies

There are currently no aquatic field studies available for myclobutanil.

b. Aquatic Plants

Table 24. Aquatic Plant Toxicity Data

Common Name	%AI	Toxicity	NOAEC	MRID	Classification /Category
Freshwater green algae Tier II reproduction *Selenastrum capricornutum*	100	120-hour EC_{50} **0.83 mg/L**[1] (0.56-1.1)[2]. Mean measured concentrations tested: 0, 0 (solvent), 0.56, 1.1, 2.2, 5.1, 6.6 mg/L	120-hour NOAEC = 0.56 mg/L LOAEC = 1.1 mg/L (cell density)	419848-01	Acceptable

[1] **Bold** value is the value that will be used to calculate risk quotients
[2] Range is 95% confidence interval for endpoint

2. Terrestrial Effects Characterization

a. Terrestrial Animals

(1) Acute Effects

Birds

Table 25. Avian Acute Toxicity Data					
Common Name	**%AI**	**Study parameters**	**LD_{50}/LC_{50} NOAEL/ LOAEL**	**MRID**	**Classification /Category**
Bobwhite Quail *Colinus virginianus*	84.5	Acute oral study 10 birds/dose level 21 day observation period 0 (vehicle), 316, 464, 681, 1000, 1470 mg/kg tested	LD_{50} **498 (408 – 598) mg/kg bw**[3] Slope = 7.03 (3.5-10.5) NOAEL not determined LOAEL 316 mg/kg (lethargy and anorexia). Mortalities at all dose levels (1, 4, 8, 10 and 10, respectively). Good dose response; NOAEL not critical in this case.	00144286	Acceptable Slightly toxic[1]
Bobwhite Quail *Colinus virginianus*	84.5	Subacute dietary study 10 birds/concentration level 5 days on treatment, 3 days observation 0 (vehicle), 246, 641, 1150, 3000, 4530 ppm tested (measured concentrations)	LC_{50} >4530 ppm NOAEC: 1150 ppm LOAEC: 3000 ppm Mortality: 2 at 3000 ppm and 1 at 4530 ppm. Anorexia and lethargy at 3000 and 4530 ppm	00144287	Acceptable Slightly toxic[2]
Mallard Duck *Anas platyrhynchos*	84.5	Subacute dietary study 10 birds/concentration level 5 days on treatment, 3 days observation 0 (vehicle), 270, 620, 1250, 2220, 4090 ppm tested (measured concentrations)	LC_{50} **>4090 ppm** NOAEC: 1250 ppm LOAEC: 2220 ppm (anorexia and lethargy). One bird died at 4090 ppm.	00144288	Acceptable Slightly toxic[2]

[1] Based on LD_{50} (mg/kg) <10 very highly toxic; 10-50 highly toxic; 51-500 moderately toxic; 501-2000 slightly toxic; >2000 practically nontoxic

[2] Based on LC_{50} (mg/kg) <50 very highly toxic; 50-500 highly toxic; 501-1000 moderately toxic; 1001-5000 slightly toxic; >5000 practically nontoxic

[3] **Bold** value is the value that will be used to calculate risk quotients

Mammals

Table 26. Mammalian Acute Toxicity Data					
Common Name	**%AI**	Study parameters	**LD_{50} /NOAEL**	**MRID**	**Classification /Category**
Laboratory mouse *Mus musculus*	91.9	Acute oral study 0, 1.3, 2.0, 3.2, 5.0 g/kg bw tested 10/dose level 14-day observation period	Acute oral LD_{50}=**1360 mg/kg bw** in female mice (most sensitive species (original DER mistakenly stated that it was in the rat)). Mortality at all dose levels tested. Multiple clinical signs, including ataxia, tremors, loss of righting and others – not dose-related; however, early deaths may have affected reporting. **Converts to a rat equivalent dose of 665 mg/kg for risk estimation** (see Risk Characterization Section). (HED used rat values 1.6 (M) and 2.29 (F) g/kg bw)	00165239 00141662	Acceptable Slightly toxic[1]
Laboratory mouse *Mus musculus*	1,2,4-triazole	Acute oral study	LD_{50} = 3650 mg/kg	45284001	Practically nontoxic

[1] Based on LD_{50} (mg/kg) <10 very highly toxic; 10-50 highly toxic; 51-500 moderately toxic; 501-2000 slightly toxic; >2000 practically nontoxic

[2] **Bold** value is the value that will be used to calculate risk quotients

Acute oral toxicity data with the rat are available on several myclobutanil formulations (see Table 27 below). With one exception (60 DF formulation), the myclobutanil formulations, including those mixed with other pesticides are not more acutely toxic to mammals than the technical material. The 60 DF formulation is 1.6 to 1.9 times more toxic than the technical material. The risk estimation is conducted with a mouse study. For estimation of risk and utilization in the terrestrial exposure model, T-REX, the rat equivalent dose estimated from the mouse study is 665 mg/kg bw. The assessment with this study is protective of the acute mammalian toxicity endpoint for the 60 DF formulation. However, an uncertainty remains as to whether or not the 60 DF would be more acutely toxic in the mouse.

Table 27. Acute Rat Toxicity Comparison of Myclobutanil Formulations		
Formulation (%)	LD_{50} (mg/kg bw)	MRID
Technical Product	1600 (M) 2290 (F)	00141662
1.5% with 2.5% permethrin	> 5050 (M & F)	44155803
2.25% with 60% mancozeb	> 5000 (M)	40149003
60% formulation with inerts	980 (M) 1235 (F)	00164467, 00164468
Fludioxonil, 1.45%; Mefenoxam, 3.61%; Azoxystrobin, 8.55%; and Myclobutanil, 9.75%	5979 (F)	47092603
Up-and-Down Method: 0.9% Myclobutanil	> 5000 (F)	46886701

Table 27. Acute Rat Toxicity Comparison of Myclobutanil Formulations		
Formulation (%)	LD_{50} (mg/kg bw)	MRID
(granules)		
1% formulation	> 5000 (M & F)	45381001
21% formulation	3749 (F) >5000 (M)	45218401
6.0% formulation	LD_{50} between 500 & 5,000 (M & F)	45056903
1% formulation	> 5,000 (M & F)	44265201

Terrestrial Invertebrates

Data on honey bees are available (MRID 00144289); however, a review of the study is not available and it is not known whether or not this study is acceptable. The bees were exposed to a finished dust containing 27.58% a.i. in a bell jar vacuum duster at dosages of approximately 120, 240 or 362 µg technical material per bee. Observations for clinical signs of toxicity were made daily for 96 hours. These data indicate that myclobutanil (81.1%) technical may not be toxic to honey bees at a dosage of 100 µg/bee.

(2) Chronic Effects

Birds

Table 28. Avian Chronic Toxicity Data					
Common Name	**%AI**	**Study Parameters**	**NOAEC/LOAEC**	**MRID**	**Classification /Category**
Bobwhite Quail *Colinus virginianus*	94.2	Reproduction study Mean measured concentrations: 0 (vehicle), 72.5, 124.2, 181.8, 255.8 ppm 16 pairs per concentration level	NOAEC = **256 ppm**[1] LOAEC >256 ppm No treatment-related effects at any level. Not tested at sufficiently high concentration levels	43087901	Supplemental
Mallard Duck *Anas platyrhynchos*	94.2	Reproduction study Mean measured concentrations: 0 (vehicle), 72.5, 124.2, 181.8, 255.8 ppm 16 pairs per concentration level	NOAEC = 256 ppm LOAEC >256 ppm No treatment-related effects at any level. Not tested at sufficiently high concentration levels	43087902	Supplemental

[1] **Bold** value is the value that will be used to calculate risk quotients

Mammals

Table 29. Mammalian Chronic Toxicity Data					
Common Name	**%AI**	**Study Parameters**	**NOAEC/ LOAEC**	**MRID**	**Classification/ Category**
Laboratory rat *Rattus norvegicus*	84.5	2-Generation reproduction study 25 rats/sex/group 0, 50, 200 or 1000 ppm 4, 16 or 80 mg/kg bw/day based on overall mean concentration of active ingredient in dietary analyses (HED document 004936; HED records center file R050631)	**NOAEC = 200 ppm** **NOAEL = 16 mg/kg/day** LOAEC=1000 ppm LOAEL = 80 mg/kg/day (testicular, epididymal and prostatic atrophy in P2 males; slight increase in stillborns, decrease in body weight gain in pups during lactation in F1 and F2 generations)	00149581 00143766	Acceptable
Laboratory rat *Rattus norvegicus*	1,2,4-triazole	Reproduction and fertility effects 0, 250, 500, 3000 ppm **M:** 15, 31, 189 mkd **F:** 18, 36, 218 mkd	**Parental NOAEL:** <15 mg/kg/day **Parental LOAEL**: 15 mg/kg/day **Offspring NOAEL:** <19 mg/kg/day **Offspring LOAEL:** 19 mg/kg/day based **Repro NOAEL**: 15 mg/kg/day **Repro LOAEL**: 31 mg/kg/day based on abnormal sperm and ↓# of CL in F1 females At 218 mg/kg/day, reproductive failure (no viable offspring), ↑CL in F0 parental females	46467304	Acceptable

[1] **Bold** value is the value that will be used to calculate risk quotients

(3) Field Studies

There are currently no terrestrial ecotoxicity field studies available for myclobutanil.

b. Terrestrial Plants

There are currently no terrestrial plant studies available for myclobutanil.

IV. Risk Characterization

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A. Risk Estimation - Integration of Exposure and Effects Data

A quantitative estimation of risk integrates EECs and toxicity estimates and evaluates the likelihood of adverse ecological effects to non-target species. In a deterministic approach, an exposure estimate is divided by a single point estimate of toxicity to calculate a risk quotient (RQ). The RQ is then compared to Agency Levels of Concern (LOCs, **Appendix E**), which serve as criteria for categorizing potential risk to non-target organisms and the need to consider regulatory action.

There are no toxicity data with the degradate, 1,2,4-triazole for aquatic organisms. Therefore, the degradate was considered to be of equal toxicity to the parent and was factored into the aquatic EECs as total toxic residues. No toxicity data with the degradate are available for birds. The chronic studies with the parent, myclobutanil on birds indicates no toxicity; however, the studies were not tested at concentration levels as high as levels in mammals that showed reproductive effects. Acute and chronic toxicity data for the degradate are available for mammals. These data indicate that the degradate is less toxic than the parent on an acute basis and is equally toxic as the parent on a chronic basis. The target organs in the chronic studies are similar as well. Both the parent, myclobutanil and the 1,2,4-triazole degradate are considered to be persistent. In addition, the drinking water assessment in support of the human health aggregate risk assessment on 1,2,4-triazole, triazole alanine, triazole acetic acid states that the degradate residue may accumulate in plants after triazole application on cropped soil and thus be available on a chronic exposure basis (Memorandum from I. Maher to M. Doherty et. al, 2/28/2006; D320682).

Therefore, based on the mammalian toxicity data, the persistence data on both the parent and the degradate and indications that the degradate may accumulate in plants, the potential additional risk to terrestrial organisms from the degradate is considered only following chronic exposure. Potential additional risks from the degradate will be discussed in the risk description section IV.B.2.a.(2).

1. Risk to Aquatic Animals and Plants

a. Aquatic Animals

(1) Risk Following Acute Exposure

Freshwater Fish and Aquatic-Phase Amphibians

The acute LOC for endangered freshwater fish is exceeded for one modeled scenario, LA tropical fruit, both aerial and ground application. None of the acute freshwater fish LOCs are exceeded for any of the other tropical fruit scenarios or for any of the other proposed uses. Table 30 shows the acute risk for freshwater fish with the LA tropical fruit scenario and with the scenario which provides the next highest peak EECs (CA lettuce).

Table 30. Myclobutanil: Acute Risks to Freshwater Fish

Species	Toxicity Endpoint (µg/L)	Scenario App. Rate # Applications/yr.	Peak EEC (µg/L)	Acute Risk Quotient[1]	Levels of Concern Exceeded[2]
Bluegill sunfish *Lepomis macrochirus*	96-hr LC_{50}= 2400 Technical	LA- Tropical Fruit 0.25 lb a.i./A 8 applications/season Aerial	202.7	**0.08**[3]	Yes
Bluegill sunfish *Lepomis macrochirus*	96-hr LC_{50}= 2400 Technical	LA- Tropical Fruit 0.25 lb a.i./A 8 applications/season Ground	194.8	**0.08**	Yes
Bluegill sunfish *Lepomis macrochirus*	96-hr LC_{50}= 2400 Technical	CA – Lettuce 2.4 lb a.i./A, 3 crops/season 4 applications/crop (12/year) Aerial	117.0	0.049	No

[1] Acute Risk Quotients are calculated using the following formula: EEC/LC_{50}

[2] Acute LOC for freshwater fish = 0.05 for endangered species, 0.1 for restricted use, and 0.5 for non-listed species

[3] **Bold** vales indicates that the acute LOCs are exceeded.

Freshwater Invertebrates

The acute LOCs are not exceeded for freshwater invertebrates for any of the proposed uses. Table 31 shows the acute risk for freshwater invertebrates with the LA tropical fruit scenario, which provides the highest potential peak EEC.

Table 31. Myclobutanil: Acute Risks to Freshwater Invertebrates					
Species	**Toxicity Endpoint (µg/L)**	**Scenario App. Rate # Applications/yr.**	**Peak EEC (µg/L)**	**Acute Risk Quotient[1]**	**Levels of Concern Exceeded[2]**
Water Flea (*Daphnia magna*)	48-hr EC_{50}= 11000 Technical	LA - Tropical Fruit 0.25 lb a.i./A 8 applications/season aerial	202.7	0.02	No

[1] Acute Risk Quotients are calculated using the following formula: EEC/LC50

[2] Acute LOC for freshwater invertebrates = 0.05 for endangered species, 0.1 for restricted use, and 0.5 for non-listed species

Marine/Estuarine Fish

The acute LOCs are not exceeded for estuarine/marine fish for any of the proposed uses. Table 32 shows the acute risk for estuarine/marine fish with the LA tropical fruit scenario, which provides the highest potential peak EEC.

Table 32. Myclobutanil: Acute Risks to Marine/Estuarine Fish					
Species	**Toxicity Endpoint (µg/L)**	**Scenario App. Rate # Applications/yr.**	**Peak EEC (µg/L)**	**Acute Risk Quotient[1]**	**Levels of Concern Exceeded[2]**
Sheepshead Minnow (*Cyprinodon variegates*)	96-hr LC_{50}= 4700 Technical	LA - Tropical Fruit 0.25 lb a.i./A 8 applications/season aerial	202.7	0.04	No

[1] Acute Risk Quotients are calculated using the following formula: EEC/LC50

[2] Acute LOC for freshwater fish = 0.05 for endangered species, 0.1 for restricted use, and 0.5 for non-listed species

Marine/Estuarine Invertebrates

For mollusks, the acute endangered species and restricted use LOCs are exceeded with tropical fruit (LA and PR) and CA lettuce scenarios for both ground and aerial applications. None of the other proposed uses exceed the acute LOCs, including the CA tropical fruit scenario, either with ground or aerial applications. For crustaceans, all of the acute aquatic LOCs are exceeded for tropical fruit (LA), both aerial and ground applications. The acute restricted use aquatic LOC is exceeded for lettuce (CA, aerial and ground) and tropical fruit (PR, aerial and ground and CA, aerial). The acute endangered species aquatic LOC is exceeded for all uses except okra (CA, aerial and ground) and tropical fruit (FL, ground). For EECs for all uses, please see Table 12.

Table 33 summarizes acute risks for marine/estuarine invertebrates with the selected scenarios.

Table 33. Myclobutanil: Acute Risks to Marine/Estuarine Invertebrates

Species	Toxicity Endpoint (µg/L)	Scenario App. Rate # Applications/yr.	Peak EEC (µg/L)	Acute Risk Quotient[1]	Levels of Concern Exceeded[2]
Eastern Oyster (*Crassostrea virginica*)	96-hr EC_{50}= 680 Technical	LA - Tropical Fruit 0.25 lb a.i./A 8 applications/season Aerial	202.7	**0.27**[3]	Yes
Eastern Oyster (*Crassostrea virginica*)	96-hr EC_{50}= 680 Technical	CA – Lettuce 2.4 lb a.i/A, 3 crops/season 4 applications/crop (12/year) Ground	117.0	**0.14**	Yes
Eastern Oyster (*Crassostrea virginica*)	96-hr EC_{50}= 680 Technical	PR – Tropical Fruit 0.25 lb a.i./A 8 applications/season Ground	102.3	**0.14**	Yes
Eastern Oyster (*Crassostrea virginica*)	96-hr EC_{50}= 680 Technical	CA - Tropical Fruit 0.25 lb a.i./A 8 applications/season Aerial	28.0	0.03	No
Mysid (*Mysidopsis bahia*)	96-hr LC_{50}= 240 Technical	LA - Tropical Fruit 0.25 lb a.i./A 8 applications/season Aerial	202.7	**0.84**	Yes
Mysid (*Mysidopsis bahia*)	96-hr LC_{50}= 240 Technical	CA – Artichoke 0.10 lb a.i./A 6 applications/season Ground	23.5	**0.098**	Yes
Mysid (*Mysidopsis bahia*)	96-hr LC_{50}= 240 Technical	CA - Tropical Fruit 0.25 lb a.i./A 8 applications/season Ground	12.3	**0.05**	Yes

Table 33. Myclobutanil: Acute Risks to Marine/Estuarine Invertebrates					
Species	**Toxicity Endpoint (µg/L)**	**Scenario App. Rate # Applications/yr.**	**Peak EEC (µg/L)**	**Acute Risk Quotient[1]**	**Levels of Concern Exceeded[2]**
Mysid (*Mysidopsis bahia*)	96-hr LC_{50}= 240 Technical	Fl - Tropical Fruit 0.25 lb a.i./A 8 applications/season Ground	8.0	0.03	No

[1] Acute Risk Quotients are calculated using the following formula: EEC/LC50

[2] Acute LOC for freshwater invertebrates = 0.05 for endangered species, 0.1 for restricted use, and 0.5 for non-listed species

[3] **Bold** vales indicates that the acute LOCs are exceeded.

(2) Risk Following Chronic Exposure

Freshwater Fish and Aquatic-Phase Amphibians

The chronic LOC for aquatic species is not exceeded for any of the proposed uses. Table 34 shows the chronic risk for freshwater fish with the tropical fruit (LA) scenario, which provides the highest potential 60-day EEC.

Table 34. Myclobutanil: Chronic Risks to Freshwater Fish					
Species	**Toxicity Endpoint (µg/L)**	**Scenario App. Rate # Applications/yr.**	**60-Day EEC (µg/L)**	**Chronic Risk Quotient[1]**	**Levels of Concern Exceeded[2]**
Fathead Minnow (*Pimephales promelas*)	NOAEC = 980 Technical	LA – Tropical Fruit 0.25 lb a.i./A 8 applications/season Aerial	197.8	0.20	No

[1] Chronic Risk Quotients are calculated using the following formula: EEC/NOAEC

[2] Chronic LOC for freshwater fish = 1

Freshwater Invertebrates

Risk to freshwater invertebrates following chronic exposure was not estimated because no chronic toxicity studies are available.

Marine/Estuarine Fish

A chronic toxicity study was not available for estuarine/marine fish. Therefore, an acute to chronic ratio with freshwater fish and marine/estuarine fish was utilized to estimate a chronic toxicity endpoint for marine/estuarine fish for use in assessing potential risk. The acute toxicity

values for freshwater and estuarine/marine fish are 2400 and 4700 ppb, respectively. The chronic toxicity endpoint for freshwater fish is 980 ppb. The ratio of the acute values is 4700/2400 = 1.96. Nine hundred eighty X 1.96 = 1921 ppb. This value will be used as a chronic value for marine/estuarine fish. The chronic LOC for aquatic species is not exceeded for any of the proposed uses. Table 35 shows the chronic risk for marine/estuarine fish with the tropical fruit scenario (LA), which provides the highest potential 60-day EEC.

Table 35. Myclobutanil: Chronic Risks to Marine/Estuarine Fish

Species	Toxicity Endpoint (µg/L)	Scenario App. Rate # Applications/yr.	60-Day EEC (µg/L)	Chronic Risk Quotient[1]	Levels of Concern Exceeded[2]
Sheepshead Minnow (*Cyprinodon variegates*)	NOAEC = 1921	LA - Tropical Fruit 0.25 lb a.i./A 8 applications/season Aerial	197.8	0.10	No

[1] Chronic Risk Quotients are calculated using the following formula: EEC/NOAEC with the NOAEC value estimated with an acute to chronic ratio, utilizing the acute data from freshwater and marine/estuarine fish studies and chronic data from a freshwater fish study.
[2] Chronic LOC for marine/estuarine fish = 1

Marine/Estuarine Invertebrates

Risk to estuarine/marine invertebrates following chronic exposure was not estimated because no toxicity studies are available.

b. Aquatic Plants

Risk to aquatic vascular plants was not estimated because no toxicity studies are available. The aquatic plant LOC is not exceeded for aquatic listed and unlisted nonvascular plants for any of the proposed uses. Table 36 summarizes risk to aquatic non-vascular plants with the tropical fruit scenario (LA), which provides the highest potential peak EECs.

Table 36. Myclobutanil: Risk to Aquatic Plants[a,b,c]		
Scenario	Unlisted Non-Vascular Plant RQs[d]	Listed Non-Vascular Plant RQs[d]
LA - Tropical Fruit 0.25 lb a.i./A 8 applications/season	0.24 aerial 0.23 ground	0.36 aerial 0.35 ground

[a] Peak EEC for tropical fruit (LA) is 202.7 ppb for aerial and 194.8 for ground applications; detailed calculations of PRZM/EXAMS modeling is provided in Appendix B.
[b] Acute Risk Quotients are calculated using the following formulas: EEC/EC_{50} for unlisted plants and EEC/NOAEC for listed plants; Endangered Species LOC = 1.0.
[c] Based on endangered toxicity threshold (NOAEC) of 560 µg/L and unlisted plant toxicity threshold (EC_{50}) of 830 µg/L (MRID 43889102) for freshwater non-vascular plants.
[d] There are no vascular plant toxicity data.

2. Risk to Terrestrial Animals and Plants

a. Terrestrial Animals

To assess risks of myclobutanil to non-target birds and mammals, EECs and acute and chronic RQs for residues on various forage categories (short grass, tall grass, broadleaf plants/small insects, fruits/pods/large insects, and seeds) were obtained from the Tier 1 model, T-REX v. 1.3.1 for foliar spray applications to the proposed crops. The model assumes initial concentrations on plant surfaces based on Kenaga predicted maximum residues as modified by Fletcher *et al.* (1994), and assumes first-order dissipation. Inputs in T-REX include multiple applications where applicable.

For birds, acute RQs are derived using dose-based and dietary-based acute toxicity values, and chronic RQs are derived using a dietary-based chronic toxicity value. For mammals, acute RQs are derived using a dose-based acute toxicity value, and chronic RQs are derived using a dietary-based chronic toxicity value and a dose-based chronic toxicity value calculated by the study authors (MRIDs 00149581 and 00143766), of the study using measured food consumption and body weight values. Dietary-based RQs are calculated using EECs expressed in terms of residue concentration for the various forage categories and toxicity values (LC_{50} or NOAEC) expressed in units of dietary concentration. Dose-based RQs are calculated using a body weight-adjusted LD_{50} and consumption-weighted equivalent dose sorted by food source and body size. For both birds and mammals, three weight categories (or sizes) are considered. Tables 37 through 44 summarize the upper bound terrestrial EECs and acute and chronic RQ values for birds and mammals.

(1) Risk Following Acute Exposure

Birds

Tables 37 and 38 show that the acute dose-based LOCs are exceeded for birds in several categories for the proposed new uses. For the requested use on tropical fruits, the acute LOC for 20 gram non-listed avian species eating short grass is exceeded. The acute LOC for non-listed birds is not exceeded for any of the other food categories or bird weight classes for any of the proposed uses. The acute restricted use LOC is exceeded for tropical fruits with 20 g birds eating tall grass, broadleaf plants and small insects and 100 g birds eating short grass. It is also exceeded for the other uses with 20 g birds eating short grass. The acute endangered species LOC is exceeded for tropical fruits with 100 g birds eating tall grass, broadleaf plants and small insects and with 1000 g birds eating short grass. It is also exceeded for the other uses with 20 g birds eating tall grass, broadleaf plants and small insects and with 100 g birds eating short grass. Not seen in these tables, but having the same LOC exceedences are artichokes (0.1 lb a.i./A, 6 applications/season) and fruiting vegetables and other crops (0.125 lb a.i./A, 4 applications/season with a 14-day interval; see Appendix G). The acute dose-based RQs for birds that exceed the LOCs range from 0.10 to 0.70.

The subacute dietary LC_{50} for birds is greater than the highest concentration/dose tested in each study. Therefore, no risk quotients are presented. The potential for acute dietary-based risk to birds is discussed further in the Risk Description section.

Table 37. T-REX Tropical Fruits Rally 40WSP/Nova 40W 0.25 lb a.i./A; 8 applications/season Upper Bound Kenaga

Acute Avian Dose-Based Risk Quotients

Size Class (grams)	Adjusted LD50	EECs and RQs							
		Short Grass		Tall Grass		Broadleaf Plants/ Small Insects		Fruits/Pods/ Seeds/ Large Insects	
		EEC	RQ	EEC	RQ	EEC	RQ	EEC	RQ
20	358.77	251.50	**0.70**[1,2]	115.27	**0.32**	141.47	**0.39**	15.72	0.04
100	456.74	143.41	**0.31**	65.73	**0.14**	80.67	**0.18**	8.96	0.02
1000	645.16	64.21	**0.10**	29.43	0.05	36.12	0.06	4.01	0.01

[1]LOC for acute risk = 0.5, acute restricted use = 0.2, acute endangered species = 0.1

[2] **Bolded** values exceed LOC

Table 38. Fruiting Vegetables and Other Crops 40WSP/Nova 40W 0.125 lb a.i./A; 4 applications/season; 10-Day Interval Upper Bound Kenaga EECs Acute Avian Dose-Based Risk Quotients									
Size Class (grams)	Adjusted LD50	EECs and RQs							
		Short Grass		Tall Grass		Broadleaf Plants/ Small Insects		Fruits/Pods/ Seeds/ Large Insects	
		EEC	RQ	EEC	RQ	EEC	RQ	EEC	RQ
20	358.77	104.05	**0.29**[1,2]	47.69	**0.13**	58.53	**0.16**	6.50	0.02
100	456.74	59.33	**0.13**	27.19	0.06	33.38	0.07	3.71	0.01
1000	645.16	26.56	0.04	12.18	0.02	14.94	0.02	1.66	<0.01

[1]LOC for acute risk = 0.5, acute restricted use = 0.2, acute endangered species = 0.1
[2] **Bolded** values exceed LOC

Mammals

For mammals, the most sensitive acute endpoint is based on an acute oral study conducted with the mouse. The T-REX terrestrial model estimations utilize acute toxicity values for the rat. Therefore, in order to use the acute mouse study in the model, the acute oral LD_{50} from the mouse study was adjusted with the following equations taken from the T-REX v. 1.3.1 users guide p. 20:

Adjusted mammalian LD_{50}:

$$Adj.NOAEL\ or\ LD_{50} = NOAEL\ or\ LD_{50}\left(\frac{TW}{AW}\right)^{(0.25)}$$

where:

Adj. NOAEL or LD_{50} = adjusted NOAEL or LD_{50} (mg/kg-bw)
NOAEL or LD_{50} = endpoint reported from bird study (mg/kg-bw)
TW = body weight of tested animal (350g rat)
AW = body weight of assessed animal (15g, 35g, 1000g)

TW = 20 g for an adult mouse
AW = 350 g for an adult rat

The LD_{50} from the mouse study is 1360 mg/kg.

Conversion for T-REX: $1360 \times (20/350)^{0.25} = 1360 \times 0.49 = 665$ mg/kg (this value was used in T-REX).

Table 39 shows that for the proposed application to tropical fruits, the acute endangered species LOC is exceeded for 15 and 35 g mammals eating short grass. The acute LOC for listed mammals is not exceeded for any of the other food categories or mammal weight classes for any of the proposed uses. None of the other acute LOCs are exceeded for any of the proposed uses, including artichokes (0.1 lb a.i./A, 6 applications/season) and fruiting vegetables and other crops (0.125 lb a.i./A, 4 applications/season with a 14-day interval (see Appendix G for detailed tables for all uses). The acute dose-based RQs for mammals that exceed the acute LOC for listed species are 0.12 and 0.14 for 15 and 35 g mammals, respectively (Tables 39 and 40).

Table 39. T-REX Tropical Fruits Rally 40WSP/Nova 40W 0.25 lb a.i./A; 8 applications/season Upper Bound Kenaga

Acute Mammalian Dose-Based Risk Quotients[1]

Size Class (grams)	Adjusted LD50[2]	EECs and RQs									
		Short Grass		Tall Grass		Broadleaf Plants/ Small Insects		Fruits/Pods/ Seeds/ Large Insects		Granivore	
		EEC	RQ[1]	EEC	RQ	EEC	RQ	EEC	RQ	EEC	RQ
15	1461.56	210.54	**0.14**	96.50	0.07	118.43	0.08	13.16	0.01	2.92	<0.01
35	1182.56	145.51	**0.12**	66.69	0.06	81.85	0.07	9.09	0.01	2.02	<0.01
1000	511.49	33.74	0.07	15.46	0.03	18.98	0.04	2.11	0.01	0.47	<0.01

[1]LOC for acute risk = 0.5, acute restricted use = 0.2, acute endangered species = 0.1

[2] LD_{50} based on acute toxicity study on the mouse, most sensitive species

[3] **Bolded** values exceed the LOC

Table 40. Fruiting Vegetables and Other Crops 40WSP/Nova 40W 0.125 lb a.i./A; 4 applications/season; 10-Day Interval Upper Bound Kenaga EECs

Acute Mammalian Dose-Based Risk Quotients

Size Class (grams)	Adjusted LD50	EECs and RQs									
		Short Grass		Tall Grass		Broadleaf Plants/ Small Insects		Fruits/Pods/ Seeds/ Large Insects		Granivore	
		EEC	RQ[1]	EEC	RQ	EEC	RQ	EEC	RQ	EEC	RQ
15	1461.56	87.10	0.06	39.92	0.03	49.00	0.03	5.44	<0.01	1.21	<0.01
35	1182.56	60.20	0.05	27.59	0.02	33.86	0.03	3.76	<0.01	0.84	<0.01
1000	511.49	13.96	0.03	6.40	0.01	7.85	0.02	0.87	<0.01	0.19	<0.01

[1]LOC for acute risk = 0.5, acute restricted use = 0.2, acute endangered species = 0.1

(2) Risk Following Chronic Exposure

Birds

Tables 41 and 42 summarize the avian chronic dietary RQs for selected proposed myclobutanil uses. None of the RQs exceed the chronic LOC for birds for any of the proposed uses (see Appendix G for detailed tables). Therefore, risk to birds following chronic exposure to myclobutanil from these uses is not expected.

Table 41. T-REX Tropical Fruits Rally 40WSP/Nova 40W 0.25 lb a.i./A; 8 applications/season, Upper Bound Kenaga

Chronic Avian Dietary Based Risk Quotients								
	EECs and RQs[1]							
	Short Grass		Tall Grass		Broadleaf Plants/ Small Insects		Fruits/Pods/ Seeds/ Large Insects	
NOAEC (ppm)	EEC	RQ	EEC	RQ	EEC	RQ	EEC	RQ
256	220.82	0.86	101.21	0.40	124.21	0.49	13.80	0.05

Size class not used for dietary risk quotients
[1]LOC for chronic risk = 1

Table 42. Fruiting Vegetables and Other Crops 40WSP/Nova 40W 0.125 lb a.i./A; 4 applications/season; 10-Day Interval Upper Bound Kenaga EECs

Chronic Avian Dietary Based Risk Quotients								
	EECs and RQs[1]							
	Short Grass		Tall Grass		Broadleaf Plants/ Small Insects		Fruits/Pods/ Seeds/ Large Insects	
NOAEC (ppm)	EEC	RQ	EEC	RQ	EEC	RQ	EEC	RQ
256	91.36	0.36	41.87	0.16	51.39	0.20	5.71	0.02

Size class not used for dietary risk quotients
[1]LOC for chronic risk = 1

Mammals

Tables 43 and 44 summarize the mammalian chronic dietary and dose-based RQs for selected proposed myclobutanil uses. The chronic LOC for mammals is exceeded on a dietary bases for the proposed tropical fruit uses for mammals eating short grass (RQ = 1.10). The chronic LOC for mammals on a dietary basis is not exceeded for any of the other food categories

for tropical fruit or for any of the other proposed uses (see Appendix G for detailed tables on all uses). On a dose-basis, the chronic LOC for mammals is exceeded for all proposed uses in some food categories. It is exceeded for all weight classes for all uses for mammals eating short grass. For the tropical fruit use, the chronic LOC is exceeded for all weight classes for tall grass, broadleaf plants and small insects. For all other uses, it is exceeded for tall grass (15 g mammals) and for broadleaf plants and small insects (15 and 35 g mammals). The chronic LOC is not exceeded for the remainder of the food categories or weight classes for all uses (see Appendix G for detailed tables for all uses).

Table 43. T-REX Tropical Fruits Rally 40WSP/Nova 40W 0.25 lb a.i./A; 8 applications/season, Upper Bound Kenaga

Chronic Mammalian Dietary Based Risk Quotients

NOAEC (ppm)[1]	EECs and RQs[1]							
	Short Grass		Tall Grass		Broadleaf Plants/ Small Insects		Fruits/Pods/ Seeds/ Large Insects	
	EEC	RQ	EEC	RQ	EEC	RQ	EEC	RQ
200	220.82	**1.10**[2]	101.21	0.51	124.21	0.62	13.80	0.07

Size class not used for dietary risk quotients

Chronic Mammalian Dose-Based Risk Quotients

Size Class (grams)	Adjusted NOAEL	EECs and RQs									
		Short Grass		Tall Grass		Broadleaf Plants/ Small Insects		Fruits/Pods/ Seeds/ Large Insects		Granivore	
		EEC	RQ	EEC	RQ	EEC	RQ	EEC	RQ	EEC	RQ
15	35.17	210.54	**5.99**	96.50	**2.74**	118.43	**3.37**	13.16	0.37	2.92	0.08
35	28.45	145.51	**5.11**	66.69	**2.34**	81.85	**2.88**	9.09	0.32	2.02	0.07
1000	12.31	33.74	**2.74**	15.46	**1.26**	18.98	**1.54**	2.11	0.17	0.47	0.04

[1]LOC for chronic risk = 1

[2] **Bolded** values exceed LOC

Table 44. Fruiting Vegetables and Other Crops 40WSP/Nova 40W 0.125 lb a.i./A; 4 applications/season; 10-Day Interval Upper Bound Kenaga EECs

Chronic Mammalian Dietary Based Risk Quotients

NOAEC[1] (ppm)	EECs and RQs[1]							
	Short Grass		Tall Grass		Broadleaf Plants/ Small Insects		Fruits/Pods/ Seeds/ Large Insects	
	EEC	RQ	EEC	RQ	EEC	RQ	EEC	RQ
200	91.36	0.46	41.87	0.21	51.39	0.26	5.71	0.03

Size class not used for dietary risk quotients

Chronic Mammalian Dose-Based Risk Quotients

Size Class (grams)	Adjusted NOAEL	EECs and RQs									
		Short Grass		Tall Grass		Broadleaf Plants/ Small Insects		Fruits/Pods/ Seeds/ Large Insects		Granivore	
		EEC	RQ	EEC	RQ	EEC	RQ	EEC	RQ	EEC	RQ
15	35.17	87.10	**2.48**[2]	39.92	**1.14**	49.00	**1.39**	5.44	0.15	1.21	0.03
35	28.45	60.20	**2.12**	27.59	0.97	33.86	**1.19**	3.76	0.13	0.84	0.03
1000	12.31	13.96	**1.13**	6.40	0.52	7.85	0.64	0.87	0.07	0.19	0.02

[1]LOC for chronic risk = 1

[2] **Bolded** values exceed LOC

b. Terrestrial Plants

Risks to terrestrial plants could not be estimated because no data are available.

B. Risk Description

The risk hypothesis states that for the proposed uses of the fungicide, myclobutanil has the potential to compromise survival, reproduction and/or growth of non-target aquatic and terrestrial animals and plants, including Federally-listed endangered and threatened species. Based on the available ecotoxicity data and predicted environmental exposures, this ecological risk assessment supports the presumption of acute risk to freshwater fish, marine/estuarine invertebrates, birds and mammals and chronic risk to mammals. The presumption of acute risk to marine/estuarine fish, freshwater invertebrates, aquatic non-vascular plants and chronic risk to freshwater and marine/estuarine fish and birds is not supported by the results of this screening risk assessment. The presumption of acute risk to vascular plants and chronic risk to aquatic invertebrates could not be determined in this risk assessment due to the lack of usable toxicity data. More details on the risk conclusions can be found in the following pages.

1. Risk to Aquatic Animals and Plants

a. Aquatic Animals

(1) Risk Following Acute Exposure

Freshwater Fish and Aquatic-Phase Amphibians

As stated previously, the acute LOC for endangered freshwater fish is exceeded for one modeled scenario, LA tropical fruit, for both aerial and ground application when using the most sensitive freshwater fish (bluegill sunfish) endpoint. Although the Louisiana scenario has a very high runoff component and provides a conservative estimate of EECs for the tropical fruit scenario, potential risk to endangered freshwater fish cannot be discounted.

Freshwater Invertebrates

None of the RQs exceed the acute LOC for freshwater invertebrates for any of the proposed uses. Therefore, risk to freshwater invertebrates following acute exposure to myclobutanil from these uses is not expected.

Marine/Estuarine Fish

None of the RQs exceed the acute LOC for estuarine/marine fish for any of the proposed uses. Therefore, risk to estuarine/marine fish following acute exposure to myclobutanil from these uses is not expected.

Marine/Estuarine Invertebrates

Acute risk to mollusks is expected with the proposed uses on tropical fruit (LA and PR) and CA lettuce scenarios with either aerial or ground applications. It is not expected with other proposed uses, including the tropical fruit scenario in California. It is also anticipated that the proposed use will be around or near estuarine/marine ecosystems. The probabilities of effect on individual eastern oysters are estimated in section IV B 5 b (2) of this document. It is noted that the probabilities of effects on an individual associated with the minimum and maximum calculated RQ values for the acute eastern oyster study are 1 in 6.9E+04 and 2.4E+01, respectively. The corresponding estimate chance of an effect on an individual associated with the listed marine/estuarine invertebrate species LOC is 1 in 3.1E+02.

For crustaceans, all of the acute aquatic LOCs are exceeded for tropical fruit (LA), both aerial and ground applications. The acute restricted use aquatic LOC is exceeded for lettuce (CA, aerial and ground) and tropical fruit (PR, aerial and ground). The acute endangered species aquatic LOC is exceeded for all uses except okra (CA, aerial and ground) and tropical fruit (FL and CA, ground). Again, it is anticipated that the proposed uses will be around or near

estuarine/marine ecosystems. For crustaceans, based on the available laboratory study, the probability of an individual mortality associated with the minimum and maximum calculated RQ values for mysid are 1 in 1.2E+37 and 1 in 1.26E+02, respectively. The corresponding estimate chance of an individual mortality associated with the listed marine/estuarine invertebrate species LOC is 1 in 2.4E+16.

(2) Risk Following Chronic Exposure

Freshwater Fish and Aquatic-Phase Amphibians

None of the RQs exceed the chronic LOC for freshwater fish for any of the proposed uses. Therefore, risk to freshwater fish following chronic exposure to myclobutanil from these uses is not expected.

Freshwater Invertebrates

No data are available for freshwater invertebrates. Therefore, a quantitative assessment of risk was not conducted. This does not preclude potential risk to these taxonomic groups.

Marine/Estuarine Fish

None of the RQs exceed the chronic LOC for estuarine/marine fish for any of the proposed uses. Therefore, risk to estuarine/marine fish following chronic exposure to myclobutanil from these uses is not expected. The chronic toxicity value for marine/estuarine fish was estimated using an acute to chronic ratio with acute studies with freshwater and marine/estuarine fish and a chronic study with freshwater fish. Therefore, there is uncertainty associated with the chronic toxicity value for marine/estuarine fish. The acute toxicity value for marine/estuarine fish exposed to myclobutanil is half of the acute toxicity value for freshwater fish. The RQ for freshwater fish following chronic exposure is 1/10 of the chronic LOC for fish. Therefore, it is anticipated that the chronic RQ for marine/estuarine fish will not exceed the chronic LOC for aquatic organisms.

Marine/Estuarine Invertebrates

No data are available for marine/estuarine invertebrates. Therefore, a quantitative assessment of risk was not conducted. This does not preclude potential risk to these taxa, especially since there are risks following acute exposure.

b. Aquatic Plants

None of the RQs exceed the LOC for aquatic non-vascular plants for any of the proposed uses. Therefore, risk to non-vascular plants following exposure to myclobutanil from these uses is not expected. No data are available for vascular aquatic plants. Therefore, a quantitative

assessment of risk was not conducted. This does not preclude a potential risk to this taxonomic group.

2. Risk to Terrestrial Animals and Plants

a. Terrestrial Animals

Some of the labels specify that the application rate is seasonal. Terrestrial exposures were estimated assuming that myclobutanil is applied to one crop per year. For some crops, such as green leafy vegetables, there may be two or more crop production seasons per year. In these cases, the predicted terrestrial exposures from the T-REX model may not be sufficiently conservative and the estimated RQs may actually be higher. The application interval between seasons is not known. In addition, the foliar dissipation rate and the residue decline data for the technical material are not clear. The available studies are not sufficient for estimating a foliar half-life or foliar dissipation rate for myclobutanil. Nevertheless, for the purpose of risk description, terrestrial exposure was modeled with several foliar dissipation and/or residue decline rates. At this time, the T-REX model cannot accurately estimate terrestrial exposure levels with pesticides applied with varying application rates and application intervals. The technology is not yet available for these types of estimations.

(1) Risk Following Acute Exposure

Birds

As shown in the risk estimation section, the acute dose-based LOC is exceeded for birds in several categories for all proposed new uses with acute dose-based RQs for birds ranging from 0.10 to 0.70. Tables 45 and 46 show that even with mean Kenaga EEC values, the acute LOC for endangered birds is exceeded for 20 and 100 g birds eating short grass (tropical fruits) and 20 g birds eating short grass (fruiting vegetables and other crops with 10-day application interval). In one case (20 g birds eating short grass for tropical fruits), the acute LOC for restricted use is exceeded. With mean Kenaga values, the acute dose-based RQs for birds do not exceed the acute LOCs with the proposed use for fruiting vegetables and other crops (14-day application interval) and artichokes (see Appendix G).

Table 45. T-REX Tropical Fruits Rally 40WSP/Nova 40W 0.25 lb a.i./A; 8 applications/season Mean Kenaga EECs									
Acute Avian Dose-Based Risk Quotients									
Size Class (grams)	**Adjusted LD50**	**EECs and RQs**							
		Short Grass		**Tall Grass**		**Broadleaf Plants/ Small Insects**		**Fruits/Pods/ Seeds/ Large Insects**	
		EEC	**RQ**	**EEC**	**RQ**	**EEC**	**RQ**	**EEC**	**RQ**
20	358.77	89.16	**0.249**	37.76	**0.11**	47.20	**0.132**	7.34	0.020
100	456.74	50.84	**0.111**	21.53	0.05	26.91	0.059	4.19	0.009
1000	645.16	22.68	0.035	9.61	0.06	12.01	0.019	1.87	0.003

[1]LOC for acute risk = 0.5, acute restricted use = 0.2, acute endangered species = 0.1
[2] **Bolded** values exceed LOC

Table 46. T-REX Fruiting Vegetables and Other Crops 40WSP/Nova 40W 0.125 lb a.i./A; 4 applications/season; 10-Day Application Interval Mean Kenaga EECs									
Acute Avian Dose-Based Risk Quotients									
Size Class (grams)	**Adjusted LD50**	**EECs and RQs**							
		Short Grass		**Tall Grass**		**Broadleaf Plants/ Small Insects**		**Fruits/Pods/ Seeds/ Large Insects**	
		EEC	**RQ[1,2]**	**EEC**	**RQ**	**EEC**	**RQ**	**EEC**	**RQ**
20	358.77	36.89	**0.103**	15.62	0.044	19.53	0.054	3.04	0.008
100	456.74	21.03	0.046	8.91	0.020	11.13	0.024	1.73	0.004
1000	645.16	9.38	0.015	3.97	0.006	4.97	0.008	0.77	0.001

[1]LOC for acute risk = 0.5, acute restricted use = 0.2, acute endangered species = 0.1
[2] **Bolded** values exceed LOC

Even if the half-life of myclobutanil is decreased from the default of 35 days to 2 days, the acute LOC for listed species is still exceeded for short grass, broadleaf plants and small insects for 20 g birds (tropical fruit) and short grass for 20 g birds (fruiting vegetables and other crops) with an RQ range of 0.1 to 0.19.

As stated previously, acute RQs were not estimated because the LC_{50}'s for the subacute dietary bird studies were greater than the highest concentration tested. A comparison of the lowest LC_{50} (4090 ppm) with the highest terrestrial EEC from T-REX (220.82 ppm; Tables 18a, 18b, 41) shows that the LC_{50} is greater than 18.5 times the maximum acute terrestrial EEC (tropical fruit). The acute LOC for listed species is 0.1. The ratio of the highest EEC to the

lowest LC_{50} is less than 0.054. Therefore, acute dietary risk to listed avian species is not expected.

As discussed above, the acute dose-based LOC is exceeded for birds in several categories for all proposed new uses. For the purpose of this screening level assessment, the more conservative RQs (in this case, dose-based) are used to estimate risk. In this assessment, it appears that the potential risk from a single acute oral dose basis is considerably greater than potential risk from a subacute dietary basis. This is likely due in part to the inherent uncertainties associated with the two acute/subacute toxicity tests. Refer to the Assumptions, Limitations and Uncertainties Section IV.C.3.c.: Dietary Intake and Other Limitations of Oral Studies in Terrestrial Species for a more complete discussion of the uncertainties associated with these two avian studies.

Mammals

As stated in the risk estimation section, the acute dose-based RQ's exceed the endangered species LOC for mammals (short grass; 15 and 35 g birds, RQs = 0.12 and 0.14, respectively) with the proposed tropical fruit use. None of the other uses exceed any acute LOCs for mammals. With mean Kenaga EECs, the acute dose based RQs do not exceed any acute LOCs for mammals.

Terrestrial invertebrates

Quantitation of risk to terrestrial invertebrates has not been officially incorporated into the assessment of risk to terrestrial animals. It appears that the risk to terrestrial invertebrates may be low; however, a definitive study has not been submitted. There are some data on honey bees; however, the test material is applied as a dust, which is not the usual test protocol. An official review of the data is not available and it is not known whether or not this study is acceptable for use in describing risk. These data indicate that myclobutanil (81.1%) technical may not be toxic to honey bees at a dosage of 100µg/bee.

(2) Risk Following Chronic Exposure

Birds

None of the RQs exceed the chronic LOC for birds for any of the proposed uses. Based on the EECs from the parent only, risk to birds following chronic exposure to myclobutanil from these uses is not expected.

A conservative estimate of the potential additional risk from the degradate may be conducted by adding the maximum percentage of degradate that may be formed in foliage following myclobutanil application to the estimated residues of the parent. Refinement of these estimates are beyond the capabilities of the T-REX model at this time. In a memorandum from Michael Doherty et al. to Tamue Gibson/Cynthia Giles-Parker: 1,2,4-Triazole, Triazole Alanine, Triazole Acetic Acid: Human Health Aggregate Risk Assessment in Support of Reregistration

and Registration Actions for Triazole-derivative Fungicide Compounds and dated February 7, 2006 (DP # 322215), "residue levels of 1,2,4-triazole were estimated from parent triazole-derivative fungicide tolerances. For each food/parent fungicide tolerance combination, a residue estimate was calculated by multiplying the tolerance by a metabolic conversion factor and by a molecular weight conversion factor. Direct-exposure residue levels used the metabolic factors from plant metabolism studies for crop commodities and from livestock metabolism studies for livestock commodities...For some compounds metabolic conversion factors were not readily available and the maximum factors from the entire class of compounds were used (20% for plants...77% for livestock)." Using the 20% estimate factor from plants and adding that 20% onto the estimated RQs for the parent, the RQ for short grass (tropical fruit application) exceeds the chronic avian LOC of 1 when combining the residues from the parent with potential maximum residues from the 1,2,4-triazole degradate. The RQ will be 1.03. The chronic EEC for short grass (tropical fruits) is 220.82. For birds, the EEC would have to be less than 204.8 ppm in order for the chronic LOC to not be exceeded.

Mammals

As stated in the risk estimation section, the chronic dietary-based RQ for mammals eating short grass exceeds the chronic LOC for the proposed tropical fruit uses (RQ = 1.10); however, on a dietary basis, the chronic LOC is not exceeded for any of the other uses. The chronic dose-based RQs exceed the chronic LOC for mammals eating short grass with all uses for all weight classes. For the tropical fruit use, the chronic dose-based RQs exceed the chronic LOC for all weight classes for tall grass, broadleaf plants and small insects. For all other uses, it is exceeded only for tall grass (15 g mammals) and for broadleaf plants and small insects (15 and 35 g mammals). With mean Kenaga values, the chronic LOC for mammals is not exceeded on a dietary basis for any of the proposed uses. On a dose-basis, the chronic LOC is exceeded for the tropical fruit use for 15 and 35 g mammals eating short grass. It is not exceeded with any of the other uses.

Although residue decline/foliar dissipation data have been submitted for myclobutanil, many of these studies are not acceptable and as stated previously, it is unclear as to whether or not these studies provide sufficient data to provide a foliar half-life for use in the terrestrial exposure model, T-REX (Version 1.3.1). Therefore, estimations of risk were conducted with various half-lives for myclobutanil on foliage for risk description purposes. Even with a foliar dissipation/residue decline half-life of 2 days for myclobutanil, the chronic LOC is still exceeded with tropical fruit uses for 15 and 35 g mammals eating short grass (RQs = 1.64 and 1.4 for 15 and 35 g mammals, respectively using the maximum Kenaga values). For fruiting vegetables (10-day interval), the chronic dose-based RQ for short grass exceeds the chronic mammalian LOC when the half-life exceeds 4 days. For fruiting vegetables (14-day interval), the same is true when the half-life exceeds 5 days and for artichokes, again, the same is true when the half-life exceeds 9 days. The chronic mammalian LOC is not exceeded when the half-life is less than 5 days for fruiting vegetables and less than 9 days for artichokes. Therefore, risk is expected for mammals following chronic exposure for all uses, especially if the half-life for myclobutanil on foliage exceeds 5-9 days, depending upon the crop and application interval.

It is noted that the labels provide application rates per season. It is expected that some green leafy vegetables will have 2 or more seasons. If the application rates and intervals remain the same, even between plantings, then the risk is expected to be higher for those crops; however, this remains an uncertainty because the current version of the T-REX model can only accommodate uniform application intervals.

As stated earlier, a reproduction study in mammals on the 1,2,4-triazole degradate indicates that the degradate is equally toxic as the parent on a chronic exposure basis. For the parent, the reproductive NOAEL is 16 mg/kg/day and the LOAEL is 80 mg/kg/day based on testicular, epididymal and prostatic atrophy in P2 males; slight increase in stillborns, decrease in body weight gain in pups during lactation in F1 and F2 generations. For the degradate, the reproductive NOAEL is 15 mg/kg/day and the LOAEL is 31 mg/kg/day based on abnormal sperm and a decrease in the number of corpora lutea in F_1 females. At 218 mg/kg/day, there was reproductive failure (no viable offspring). Using the 20% estimate factor from plants and adding that 20% onto the estimated RQs for the parent (see discussion in chronic risks to birds section, just above the mammalian section), the following summarizes any additional RQs that exceed the chronic mammalian LOC when combining the residues from the parent with potential maximum residues from the 1,2,4-triazole degradate:

For tropical fruit, no additional RQs will exceed the chronic mammalian LOC. For leafy greens, with the 10- day application interval, the broadleaf plants and small insects food category for 1000 g mammals (dose-based) will exceed the LOC; however, with the 14-day interval, the RQ for this food category and mammalian weight class will not exceed the LOC. Fruiting vegetables (both the 10- and 14-day application intervals) and artichoke uses will exceed the food category, tall grass for the 35 gram mammalian weight category. No other RQs for any of the proposed uses exceed the chronic mammalian LOC with the estimated maximum combined residues of the parent and the 1,2,4-triazole degradate on foliage.

b. Terrestrial Plants

Quantitative risk to terrestrial plants was not estimated because no data are available. This does not preclude potential risk to these taxonomic groups, especially in light of the incidence reports on damage to plants (see below).

3. Review of Incident Data

Three incident reports were filed for myclobutanil between 1994 and 2003, all with effects on terrestrial plants (two incidents with grapes and one with roses). The two incidents with grapes occurred in California and the one with roses was reported in Maryland. The certainty index for the damage in all 3 incidents was rated as possibly related to exposure to myclobutanil. The two incidents with grapes involved application of other pesticides as well as the myclobutanil. Therefore, it is not definitively known whether or not the effects were due to exposure to myclobutanil in these two incidents. Myclobutanil was the only pesticide applied to the rose bushes in the third reported incident.

a. Incidents Involving Aquatic Organisms

No incidents involving aquatic organisms were reported.

b. Incidents Involving Terrestrial Organisms

(1) Animals

No incidents involving terrestrial animals were reported.

(2) Plants

Incident 1: Rally 40W (myclobutanil), Pro Gibb (gibberellic acid), dimethogan 25 WP, Pro Kil Cryolite 96 (sodium fluoaluminate), Britz binder and Booster 42 Foliar Spray (polymeric polyhydroxy acids) were applied by ground application to grape vines. Shortly after the last application, scarring of the berries, stunted vine growth, lack of berry size increase, dieback of fruit from total bunches and limited cone growth with straggly branches were observed. No residue analysis was conducted. The California Commissioner's report indicated that mixtures of Pro-Gibb 4% and Pro-Kil Cryolite 96 may cause some compatibility problems. No specific data on terrestrial plants were found in the Agency files for any of the pesticides applied on this incident.

Incident 2: It was reported that Rally 40W damaged 6 acres of Red Globe and Thompson's grapes to the point that they could not be sold. Burns and necrosis on bunches (Red Globe) and leaf burn (Thompson's) were observed. Agri-MEK (abamectin) and Ad-Wet were also applied, using a ground spray on the vineyard. Again, no specific data on terrestrial plants were found in the Agency files for any of the pesticides applied on this incident.

Incident 3: Systhane (myclobutanil) was applied via a broadcast spray to rose bushes grown in greenhouses by local residents in Maryland. The total magnitude was 200 houses. Foliar necrosis and some defoliation were observed after exposure to systhane. Damage varied from house to house and by rose variety.

4. Endocrine Effects

Under the Federal Food, Drug and Cosmetic Act (FFDCA), as amended by the Food Quality Protection Act (FQPA), EPA is required to develop a screening program to determine whether certain substances (including all pesticide active and other ingredients) "may have an effect in humans that is similar to an effect produced by a naturally-occurring estrogen, or other such endocrine effects as the Administrator may designate." Following the recommendations of its Endocrine Disruptor Screening and Testing Advisory Committee (EDSTAC), EPA determined that there was scientific basis for including, as part of the program, the androgen- and thyroid hormone systems, in addition to the estrogen hormone system. EPA also adopted

EDSTAC's recommendation that the Program include evaluations of potential effects in wildlife. For pesticide chemicals, EPA will use FIFRA, to the extent that effects in wildlife may help determine whether a substance may have an effect in humans, and the FFDCA authority to require the wildlife evaluations. As the science develops and the resources allow, screening of additional hormone systems may be added to the Endocrine Disruptor Screening Program (EDSP). When the appropriate screening and or testing protocols being considered under the Agency's Endocrine Disruptor Screening Program have been developed, myclobutanil may be subjected to additional screening and or testing to better characterize effects related to endocrine disruption.

At this time, there are no indications that myclobutanil would be a candidate for additional testing for endocrine effects.

5. Federally Threatened and Endangered (Listed) Species Concerns

Section 7 of the Endangered Species Act, 16 U.S.C. Section 1536(a)(2), requires all federal agencies to consult with the National Marine Fisheries Service (NMFS) for marine and anadromous listed species, or the United States Fish and Wildlife Services (FWS) for listed wildlife and freshwater organisms, if they are proposing an "action" that may affect listed species or their designated habitat. Each federal agency is required under the Act to insure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of designated critical habitat. To jeopardize the continued existence of a listed species means "to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of the species" (50 C.F.R. § 402.02).

To facilitate compliance with the requirements of the Endangered Species Act (subsection (a)(2)), the Office of Pesticide Programs has established procedures to evaluate whether a proposed registration action may directly or indirectly reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of any listed species (USEPA, 2004). After the Agency's screening level risk assessment is conducted, if any of the Agency's listed species LOCs are exceeded for either direct or indirect effects, an analysis is conducted to determine if any listed or candidate species may co-occur in the area of the proposed pesticide use or areas downstream or downwind that could be contaminated from drift or runoff/erosion. If listed or candidate species may be present in the proposed action areas, further biological assessment is undertaken. The extent to which listed species may be at risk then determines the need for the development of a more comprehensive consultation package as required by the Endangered Species Act.

Both acute endangered species and chronic risk LOCs are considered in the screening-level risk assessment of pesticide risks to listed species. Endangered species acute LOCs are a fraction of the non-endangered species LOCs or, in the case of endangered plants, RQs are derived using lower toxicity endpoints than non-endangered plants. Therefore, concerns

regarding listed species within a taxonomic group are triggered in exposure situations where restricted use or acute risk LOCs are triggered for the same taxonomic group. The risk assessment also includes an evaluation of the potential probability of individual effects for exposures that may occur at the established endangered species LOC both in the risk characterization and the endangered species sections. This probability is calculated using the established dose/response relationship and assumes a probit (probability unit) dose/response relationship. This analysis is presented in Section IV.b.5.b(2) below.

The federal action addressed herein are the Section 3 New Uses for the pesticide product, myclobutanil, which is a fungicide. Myclobutanil is proposed to be used on fruiting vegetables (crop group 8 except tomatoes), leafy vegetables (crop subgroup 4A except spinach), tropical fruits, peppers and eggplant, artichoke, head and leaf lettuce, okra and cilantro.

a. Action Area

For listed species assessments, the action area is considered to be the area affected directly or indirectly by the Federal action and not merely the immediate area where myclobutanil is applied. At the initial Level 1 screening assessment, broadly described taxonomic groups are considered, and thus, conservatively assumes that listed species within those broad groups are co-located with the pesticide treatment area. This means that terrestrial plants and wildlife are assumed to be located on or adjacent to the treated site and aquatic organisms are assumed to be located in a surface water body adjacent to the treated site. The assessment also assumes that listed species are located within the area of highest exposure to the pesticide, and that exposure will decrease with increasing distance from the treated area.

If the assumptions associated with the screening-level action area result in RQs that are below the listed species LOCs, a "no effect" determination conclusion is made with respect to listed species in that taxa, and no further refinement of the action area is necessary. Furthermore, RQs below the listed species LOCs for a given taxonomic group indicate no concern for indirect effects upon listed species that depend upon the taxonomic group covered by the RQ as a resource. However, in situations where the screening assumptions lead to RQs in excess of the listed species LOCs for a given taxonomic group, a potential for a "may affect" conclusion exists and may be associated with direct effects on listed species belonging to that taxonomic group or may extend to indirect effects upon listed species that depend upon that taxonomic group as a resource. In such cases, additional information on the biology of listed species, the locations of these species, and the locations of use sites and could be considered along with available information on the fate and transport properties of the pesticide to determine the extent to which screening assumptions regarding an action area apply to a particular listed organism. These subsequent refinement steps could consider how this information would impact the action area for a particular listed organism and may potentially include areas of exposure that are downwind and downstream of the pesticide use site.

b. Taxonomic Groups Potentially at Risk

The preliminary risk assessment for endangered species indicates that myclobutanil exceeds the Endangered Species LOCs for the specified use scenario for the following taxonomic groups:

- Acute exposure to birds at the maximum application rate by ground and aerial spray application with the following uses: tropical fruits, fruiting vegetables and other crops with the same application rates and intervals and artichokes
- Acute exposure to mammals at the maximum application rate by ground and aerial spray application with the following uses: tropical fruits
- Chronic exposure to mammals at the maximum application rate by ground and aerial spray application with all of the proposed uses
- Acute exposure to marine/estuarine invertebrates by ground and aerial spray application

Concerns For Federally Listed as Endangered and/or Threatened Species

Table 47. Listed Species Risks Associated With Direct or Indirect Effects from Myclobutanil Use

Listed Taxon	Direct Effects	Indirect Effects
Terrestrial and semi-aquatic plants - monocots	No data are available	Yes through effects to pollinators (mammals, birds, reptiles, terrestrial-phase amphibians)
Terrestrial and semi-aquatic plants – dicots	No data are available	Yes through effects to pollinators (mammals, birds, reptiles, terrestrial-phase amphibians)
Terrestrial invertebrates	No	No
Birds	Yes	Yes through effects to mammals, freshwater fish, birds and estuarine/marine invertebrates
Terrestrial-phase amphibians	Yes[1]	Yes through effects to mammals, freshwater fish, birds and estuarine/marine invertebrates
Reptiles	Yes[1]	Yes through effects to mammals, freshwater fish, birds and estuarine/marine invertebrates
Mammals	Yes following acute and chronic exposure	Yes through effects to birds, freshwater fish, mammals and estuarine/marine invertebrates
Aquatic non-vascular plants	No	No
Aquatic vascular plants	No data are available	No
Freshwater fish	Yes	Yes through effects to freshwater fish and aquatic amphibians
Aquatic-phase amphibians	Yes[2]	Yes through effects to freshwater fish and aquatic amphibians
Freshwater invertebrates	No (no chronic data available)	Yes through effects to freshwater fish and aquatic amphibians

Table 47. Listed Species Risks Associated With Direct or Indirect Effects from Myclobutanil Use		
Listed Taxon	**Direct Effects**	**Indirect Effects**
Mollusks	No (no chronic data available)	Yes through effects to freshwater fish and aquatic amphibians
Marine/estuarine fish	No (extrapolated chronic value from freshwater fish)	Yes from marine/estuarine invertebrates
Marine/estuarine invertebrates	Yes following acute exposure (no chronic data available)	Yes from marine/estuarine invertebrates

[1] Results from avian species used as surrogate for assessing risk to terrestrial-phase amphibians and reptiles.
[2] Results from freshwater fish used as surrogate for assessing risk to aquatic-phase amphibians

(1) Discussion of Risk Quotients

The Agency's LOCs for birds, mammals and marine/estuarine invertebrates are exceeded for the uses of myclobutanil as outlined in previous sections. Should estimated exposure levels occur in proximity to listed resources, the available screening level information suggests a potential concern for direct effects on listed species within these taxonomic groups listed above associated with the uses of myclobutanil as described in Section III.A. The registrant must provide information on the proximity of Federally listed birds, mammals and marine/estuarine invertebrates to the myclobutanil use sites. This requirement may be satisfied in one of three ways: 1) having membership in the FIFRA Endangered Species Task Force (Pesticide Registration [PR] Notice 2000-2); 2) citing FIFRA Endangered Species Task Force data; or 3) independently producing these data, provided the information is of sufficient quality to meet FIFRA requirements. The information will be used by the OPP Endangered Species Protection Program to develop recommendations to avoid adverse effects to listed species.

(2) Probit Dose Response Relationship

The Agency uses the probit dose response relationship as a tool for providing additional information on the potential for acute direct effects to aquatic and terrestrial animals (U.S. EPA, 2004). As part of the risk characterization, an interpretation of acute RQ for listed species is discussed. This interpretation is presented in terms of the chance of an individual event (i.e., mortality or immobilization) should exposure at the EEC actually occur for a species with sensitivity to myclobutanil on par with the acute toxicity endpoint selected for RQ calculation. To accomplish this interpretation, the Agency uses the slope of the dose response relationship available from the toxicity study used to establish the acute toxicity measures of effect for each taxonomic group that is relevant to this assessment. The individual effects probability associated with the acute RQ is based on the mean estimate of the slope and an assumption of a probit dose response relationship. In addition to a single effects probability estimate based on the mean, upper and lower estimates of the effects probability are also provided to account for variance in the slope, if available. The upper and lower bounds of the effects probability are based on available information on the 95% confidence interval of the slope. Studies with good probit fit characteristics (i.e., statistically appropriate for the data set) are associated with a high degree of confidence. Conversely, a low degree of confidence is associated with data from studies that do

not statistically support a probit dose response relationship. In addition, confidence in the data set may be reduced by high variance in the slope (i.e., large 95% confidence intervals), despite good probit fit characteristics. In the event that dose response information is not available to estimate a slope, a default slope assumption of 4.5 (95% C.I.: 2 to 9) (Urban and Cook, 1986) is used.

Individual effect probabilities are calculated based on an Excel spreadsheet tool IECV1.1 (Individual Effect Chance Model Version 1.1) developed by the U.S. EPA, OPP, Environmental Fate and Effects Division (June 22, 2004). The model allows for such calculations by entering the mean slope estimate (and the 95% confidence bounds of that estimate) as the slope parameter for the spreadsheet. In addition, the acute RQ is entered as the desired threshold.

Birds

The probability of an individual mortality associated with the minimum and maximum calculated RQ values for the acute dose-based bird study are 1 in 3E+44 and 1 in 7, respectively. Using the upper confidence interval for the slope, the probability of an individual mortality associated with the minimum and maximum RQ values are 1 in 3E+97 and 1 in 19, respectively. Using the lower confidence interval for the slope, the probabilities are 1 in 7.8E+11 and 1 in 3.4, respectively. The corresponding estimate chance of an individual mortality associated with the listed avian species LOC is 1 in 9.7E+11 with upper and lower estimates of 1 in 4.3E+03 and 1 in 2.3E+25, respectively.

No RQs were estimated for the subacute dietary avian study because the LC_{50}'s were higher than the highest concentration tested. Therefore, the probability of an individual mortality associated with the RQs are not calculated. In addition, no slope is available for the subacute dietary studies. A default slope of 4.5, the highest concentration value tested in the subacute dietary study in the bird and the listed avian species LOC are used to estimate the probability of an individual mortality associated with the listed avian species LOC. The probability of an individual mortality associated with the listed avian species LOC is greater than 1 in 2.9E+05.

Mammals

The probability of an individual mortality associated with the minimum and maximum calculated RQ values for the acute dose-based mammal study, using a default slope of 4.5, are 1 in 1.6E+04 and 1 in 8.9E+18, respectively. The corresponding estimate chance of an individual mortality associated with the listed mammalian species LOC is 1 in 2.9E+05.

Aquatic Animals

The probability of an individual mortality associated with the minimum and maximum calculated RQ values for the acute freshwater fish study, using a default slope of 4.5, are 1 in 8.9E+18 and 1 in 6.66E+09, respectively. The corresponding estimate chance of an individual mortality associated with the listed freshwater fish species LOC is 1 in 4.2E+08.

The probability of an individual mortality associated with both the minimum and maximum calculated RQ values for the acute freshwater invertebrate study is 1 in 1.1E+42. Using the upper confidence interval for the slope, the probability of an individual mortality associated with both the minimum and maximum RQ values is 1 in 5.4E+81. Using the lower confidence interval for the slope, the probability is 1 in 8.3E+15. The corresponding estimate chance of an individual mortality associated with the listed freshwater invertebrate species LOC is 1 in 3.1E+18 with lower and upper estimates of 1 in 2.1E+07 and 1 in 2.4E+35, respectively.

The probability of an individual mortality associated with the minimum and maximum calculated RQ values for the acute marine/estuarine fish study, using a default slope of 4.5, are 1 in 8.9E+18 and 1 in 9.6E+13, respectively. The corresponding estimate chance of an individual mortality associated with the listed marine/estuarine fish species LOC is 1 is 4.2E+08.

The probability of an individual mortality associated with the minimum and maximum calculated RQ values for the acute marine/estuarine invertebrate (eastern oyster) study are 1 in 6.9E+04 and 2.4E+01, respectively. The corresponding estimate chance of an individual mortality associated with the listed marine/estuarine invertebrate species LOC is 1 in 3.1E+02.

The probability of an individual mortality associated with the minimum and maximum calculated RQ values for the acute marine/estuarine invertebrate (mysid) study are 1 in 1.2E+37 and 1 in 1.26E+02, respectively. The corresponding estimate chance of an individual mortality associated with the listed marine/estuarine invertebrate species LOC is 1 in 2.4E+16.

(3) Data Related to Under-represented Taxa

Effects data on under-represented taxonomic groups were not submitted by the Registrant. Effects data from other analyzed sources (ECOTOX Database, PAN Database) were not obtained for this screening risk assessment.

(4) Implications of Sublethal Effects

Acute Studies

For the sublethal effects discussed below, it is noted that EFED cannot quantitatively assess the relationship between any of the observed sublethal effects and potential reduction in survival or reproductive impairment at this time. Instead, the concentrations at which sublethal effects were observed in laboratory studies are discussed in relation to the concentrations at which mortality and/or reproductive effects were observed in the same laboratory studies and compared to aquatic and terrestrial EECs and assessed as to whether or not they may be expected under field conditions.

In bluegill sunfish, mortality was observed at the same concentration levels as the sublethal effects (quiescence and loss of equilibrium) and these were well above the peak aquatic EECs. In rainbow trout, loss of equilibrium, surfacing, and dark coloration were observed at lower concentration levels than those where mortality was observed. However, the concentration levels at which these effects were observed are significantly higher than the estimated aquatic EECs for any of the myclobutanil uses. Therefore, it is not anticipated that sublethal effects will be observed in fish under the conditions of use. The same holds true for aquatic invertebrates (daphnia (settling to the bottom)) and marine/estuarine fish (sheepshead minnows (erratic behavior, darkened pigmentation, lethargy, partial loss of equilibrium and rapid respiration)). In mysids, sublethal effects (lethargy and darkened pigmentation) were observed at the same concentration levels as mortality, and these were observed at concentration levels below the peak aquatic EEC. Therefore, both mortality and sublethal effects are anticipated under the conditions of use.

Terrestrial animals also exhibited sublethal effects in the acute and short-term studies. The NOAEL was not determined for Bobwhite quail. Lethargy, anorexia and mortality were observed at the lowest dietary levels. The highest terrestrial EEC is 14 times lower than the concentration level where sublethal effects (and mortality) would be observed. For mallard ducks, the highest terrestrial EEC is 10 times lower than the concentration level where sublethal effects were observed. Therefore, for birds, sublethal effects following acute exposure are not anticipated for these proposed uses.

For mammals, there was mortality at all dose levels, along with sublethal effects (ataxia, tremors, loss of righting and others). These effects were not dose-related; however, and early deaths may have affected reporting. The lowest dose where sublethal effects were observed was very close to the LD_{50}. The highest RQ is 0.14. Therefore, the terrestrial EEC is 1/0.14 or 7 times lower than the lowest dose level where sublethal effects were observed. Therefore, again, for mammals, sublethal effects following acute exposure is not anticipated for these proposed uses.

Chronic Studies

The NOAEC for the chronic study on freshwater fish is 0.98 mg/L with a LOAEC of 2.2 mg/L. There was total mortality at 8.5 mg/L. The chronic RQ for freshwater fish is 0.1, based on the NOAEC of 0.98 and the highest estimated aquatic EEC. The chronic LOC is 1. Therefore, any sublethal effects observed in the chronic fish study would be protected with the NOAEC from the study.

No effects were observed in the chronic reproduction studies in birds.

In mammals, a 2-generation reproduction study was conducted in rats at the following concentration levels: 0, 50, 200 or 1000 ppm. At 200 and 1000 ppm, centrilobular hepatocellular hypertrophy and an increase in liver weights were observed. Also at 1000 ppm, an increase in the number of stillborn/ % born dead in both generations, multifocal/diffuse

testicular atrophy, necrotic spermatocytes/spermatids/decreased spermatozoa, atrophy of the prostate, and a decrease in pup weight gain during lactation were observed. The NOAEC selected for assessing chronic risk to mammals is 200 ppm based on the effects related to reproduction. The sublethal effect, centrilobular hypertrophy is not protected by the use of the 200 ppm NOAEC; however, in this particular case, this effect is probably not a significant toxicological effect. In a longer term study at this concentration level (2-year rat study, MRID 00165247), liver mixed function oxidase activity was significantly increased at 3 months, but not after that time. Even at higher concentration levels, similar effects were noted, but no significant toxicological effects were found in the liver following chronic exposure.

c. Indirect Effects Analysis

In conducting a screen for indirect effects, direct effects LOCs for each taxonomic group are used to make inferences concerning the potential for indirect effects upon listed species that rely upon non-listed organisms in these taxonomic groups as resources critical to their life cycle. Pesticide-use scenarios, resulting in RQs that are below all direct effect listed species LOCs for all taxonomic groups assessed are considered of no concern for risks to listed species either by direct or indirect effects. However, there may be situations where a taxonomic group is not quantitatively assessed (e.g., terrestrial insects), but other lines of evidence are sufficiently supportive of concerns for indirect effects on listed organisms that are dependant upon that taxonomic group.

- **Where One or More Animal Taxonomic Group RQs Exceed the LOC for Listed Species**

The Level I screening indirect effects analysis documents those types of dependencies upon non-listed organisms that could be important sources of indirect effects to listed organisms should effective levels of the pesticide coincide with locations of listed species and the biologically based resources upon which they depend. In cases where screening-level acute RQs for a given animal group equal or exceed the endangered species acute LOC, the Agency uses the dose response relationship from the toxicity study used for calculating the RQ to estimate the probability of acute effects associated with an exposure equivalent to the EEC. This information serves as a guide to establish the need for and extent of additional analysis that may be performed using Services-provided "species profiles" as well as evaluations of the geographical and temporal nature of the exposure to ascertain if a not likely to adversely affect determination can be made. The degree to which additional analyses are performed is commensurate with the predicted probability of adverse effects from the comparison of dose response information with the EECs. The greater the probability that exposures will produce effects on a taxa, the greater the concern for potential indirect effects for listed species dependant upon that taxa, and therefore, the more intensive the analysis on the potential listed species of concern, their locations relative to the use site, and information regarding the use scenario (e.g., timing, frequency, and geographical extent of pesticide application). The greatest concerns would exist when exposure is associated with a risk higher than the effects probability associated with the non-endangered LOC for a pesticide with an average slope of 4.5.

For myclobutanil, risks are predicted for marine/estuarine invertebrates, birds, and mammals. Effects on marine/estuarine invertebrate survival or reproduction could affect other groups which feed on invertebrates (*i.e.*, other invertebrates, amphibians, mammals, birds, reptiles and fish). Changes in avian and/or mammalian populations could indirectly affect other bird or mammal species, reptiles, terrestrial-phase amphibians and plants (i.e. via pollination).

Freshwater Fish

The probability of an individual mortality associated with the minimum and maximum calculated RQ values for the acute freshwater fish study, using a default slope of 4.5, are 1 in 8.9E+18 and 1 in 6.66E+09, respectively. The corresponding estimate chance of an individual mortality associated with the listed freshwater fish species LOC is 1 in 4.2E+08.

Based on acute toxicity data and exposure estimates, indirect effects to listed species (e.g. fish, mammals, birds, amphibians and freshwater invertebrates) that rely on freshwater fish as a primary food source may be of concern.

Estuarine/Marine Invertebrates

The probability of an individual mortality associated with the minimum and maximum calculated RQ values for the acute marine/estuarine invertebrate (eastern oyster) study are 1 in 6.9E+04 and 2.4E+01, respectively. The corresponding estimate chance of an individual mortality associated with the listed marine/estuarine invertebrate species LOC is 1 in 3.1E+02.

The probability of an individual mortality associated with the minimum and maximum calculated RQ values for the acute marine/estuarine invertebrate (mysid) study are 1 in 1.2E+37 and 1 in 1.26E+02, respectively. The corresponding estimate chance of an individual mortality associated with the listed marine/estuarine invertebrate species LOC is 1 in 2.4E+16.

No data are available on reproduction and survival of marine/estuarine invertebrates following chronic exposure to myclobutanil. Based on acute toxicity data and exposure estimates, indirect effects to listed species (e.g., fish, mammals, birds, amphibians, other marine/estuarine invertebrates and reptiles) that rely on estuarine/marine invertebrates as a primary food source may be of concern.

Birds

The probability of an individual mortality associated with the minimum and maximum calculated RQ values for the acute dose-based bird study are 1 in 3E+44 and 1 in 7, respectively. Using the upper confidence interval for the slope, the probability of an individual mortality associated with the minimum and maximum RQ values are 1 in 3E+97 and 1 in 19, respectively. Using the lower confidence interval for the slope, the probabilities are 1 in 7.8E+11 and 1 in 3.4, respectively. The corresponding estimate chance of an individual mortality associated with the listed avian species LOC is 1 in 9.7E+11 with upper and lower estimates of 1 in 4.3E+03 and 1 in 2.3E+25, respectively.

No RQs were estimated for the subacute dietary avian study because the LC_{50}'s were higher than the highest concentration tested. Therefore, the probability of an individual mortality associated with the RQs was not calculated. In addition, no slope is available for the subacute dietary studies. A default slope of 4.5, the highest concentration value tested in the subacute dietary study in the bird and the listed avian species LOC are used to estimate the probability of an individual mortality associated with the listed avian species LOC. The probability of an individual mortality associated with the listed avian species LOC is greater than 1 in 2.9E+05.

The data do not indicate risks to reproduction and survival of birds following chronic exposure to myclobutanil. Based on acute risks, indirect effects to listed species (e.g., mammals, other birds, amphibians, reptiles and plants) that rely on birds as a primary food source or as pollinators may be of concern. Because birds are used as a surrogate for reptiles, there is also concern for listed animals that require reptile burrows as habitat.

Mammals

The probability of an individual mortality associated with the minimum and maximum calculated RQ values for the acute dose-based mammal study, using a default slope of 4.5, are 1 in 1.6E+04 and 1 in 8.9E+18, respectively. The corresponding estimate chance of an individual mortality associated with the listed mammalian species LOC is 1 in 2.9E+05.

The chronic endpoint for mammalian species is based on testicular, epididymal and prostatic atrophy in P2 males; slight increase in stillborns and decrease in body weight gain in pups during lactation in both the F1 and F2 generations. If reproduction following myclobutanil exposure is reduced to the extent that it has an impact on mammalian populations, reduction in mammalian populations that are used as a resource for listed species may be of concern. Given that acute and chronic LOCs are exceeded for mammals, indirect effects to listed species (e.g., other mammals, birds, amphibians, reptiles, plants (pollination) and terrestrial invertebrates) that rely on mammals as a primary food source, or on mammal burrows for shelter or breeding habitat, may be of concern.

d. Critical Habitat

In the evaluation of pesticide effects on designated critical habitat, consideration is given to the physical and biological features (constituent elements) of a critical habitat identified by the U.S Fish and Wildlife and National Marine Fisheries Services as essential to the conservation of a listed species and which may require special management considerations or protection. The evaluation of impacts for a screening level pesticide risk assessment focuses on the biological features that are constituent elements and is accomplished using the screening-level taxonomic analysis (risk quotients, RQs) and listed species levels of concern (LOCs) that are used to evaluate direct and indirect effects to listed organisms.

The screening-level risk assessment has identified potential concerns for indirect effects on listed species for those organisms dependant upon marine/estuarine invertebrates, birds or

mammals. In light of the potential for indirect effects, the next step for EPA and the Service(s) is to identify which listed species and critical habitat are potentially implicated. Analytically, the identification of such species and critical habitat can occur in either of two ways. First, the agencies could determine whether the action area overlaps critical habitat or the occupied range of any listed species. If so, EPA would examine whether the pesticide's potential impacts on non-endangered species would affect the listed species indirectly or directly affect a constituent element of the critical habitat. Alternatively, the agencies could determine which listed species depend on biological resources, or have constituent elements that fall into, the taxa that may be directly or indirectly impacted by the pesticide. Then EPA would determine whether use of the pesticide overlaps the critical habitat or the occupied range of those listed species. At present, the information reviewed by EPA does not permit use of either analytical approach to make a definitive identification of species that are potentially impacted indirectly or critical habitats that is potentially impacted directly by the use of the pesticide. EPA and the Service(s) are working together to conduct the necessary analysis.

This screening-level risk assessment for critical habitat provides a listing of potential biological features that, if they are constituent elements of one or more critical habitats, would be of potential concern. These correspond to the taxa identified above as being of potential concern for indirect effects and include the following: marine/estuarine invertebrates, birds and mammals. This list should serve as an initial step in problem formulation for further assessment of critical habitat impacts outlined above, should additional work be necessary.

e. Co-occurrence Analysis

The goal of the analysis for co-location is to determine whether sites of pesticide use are geographically associated with known locations of listed species. At the screening level, this analysis is accomplished using the LOCATES 2.10.3 database. The database uses location information for listed species at the county level and compares it to agricultural census data for crop production at the same county level of resolution. The product is a listing of federally listed species that are located within counties known to produce the crop upon which the pesticide will be used.

Table 48 below reports the states in which endangered species reside that have the proposed myclobutanil uses. The following crops were selected in LOCATES: eggplant, okra, peppers, bell, peppers, chili (all peppers - excluding bell), pimientos, avocados, avocados (PR), bananas, bananas (PR), citron (PR), citrus fruit, all, citrus fruit, other fruits/other (PR), fruits and coconuts (PR), grapefruit, grapefruit (PR), guavas, k- early citrus, kiwifruit, kumquats, lemons, lemons and limes (PR), limes, mangoes, mangoes (PR), nectarines, oranges (PR), oranges, all, oranges, other, oranges, valencia, papayas, papayas (PR), passion fruit, pineapples (PR), pineapples harvested, pineapples not harvested, plantains (PR), pomegranates, soursops (PR), tangelos, tangerines, temples, amaranth, celery, escarole and endive, lettuce, all, lettuce, head, lettuce, leaf, lettuce, romaine, parsley, rhubarb, artichokes. Some crops on the label were not listed in LOCATES. The data suggest that there is considerable potential for exposure to a variety of endangered species from myclobutanil uses.

The Agency's levels of concern for Federally listed freshwater fish (aquatic phase amphibians), marine/estuarine invertebrates, birds (reptiles and terrestrial phase amphibians) and mammals are exceeded for the proposed new uses of myclobutanil. It is assumed that LOCs are exceeded for listed species within the broad taxonomic groups co-located with myclobutanil treatment areas as described after the tables.

Table 48. Aggregated Taxa Count by State for All Selected

No species exclusions.

Minimum of 1 Acre

All Medium Types Reported

eggplant, okra, peppers, bell, peppers, chili (all peppers - excluding bell), pimientos, avocados, avocados (PR), bananas, bananas (PR), citron (PR), citrus fruit, all, citrus fruit, other, fruits / other (PR), fruits and coconuts (PR), grapefruit, grapefruit (PR), guavas, k-early citrus, kiwifruit, kumquats, lemons, lemons and limes (PR), limes, mangoes, mangoes (PR), nectarines, oranges (PR), oranges, all, oranges, other, oranges, valencia, papayas, papayas (PR), passion fruit, pineapples (PR), pineapples harvested, pineapples not harvested, plantains (PR), pomegranates, soursops (PR), tangelos, tangerines, temples, amaranth, celery, escarole and endive, lettuce, all, lettuce, head, lettuce, leaf, lettuce, romaine, parsley, rhubarb, artichokes

AL, AK, AZ, AR, CA, CO, CT, DE, DC, FL, GA, HI, ID, IL, IN, IA, KS, KY, LA, ME, MD, MA, MI, MN, MS, MO, MT, NE, NV, NH, NJ, NM, NY, NC, ND, OH, OK, OR, PA, PR, RI, SC, SD, TN, TX, UT, VT, VA, WA, WV, WI, WY

	Amphibian	Bird	Fish	Reptile	Terrestrial Mammal	Marine Mammal	Bivalve	Crustacea	Gastropod	Conf/Cycd	Dicot	Ferns	Monocot
Counties	108	818	569	326	1073	103	366	60	36	6	685	40	362
States	12	45	39	26	47	9	27	12	15	3	43	12	38
Species	20	77	128	33	60	7	68	21	67	3	613	25	67

C. Description of Assumptions, Limitations, Uncertainties, Strengths and Data Gaps

1. Assumptions, Limitations, and Uncertainties Related to Exposure For All Taxa

Maximum Use Scenario

The screening-level risk assessment focuses on characterizing potential ecological risks resulting from a maximum use scenario, which is determined from labeled statements of maximum application rate and number of applications with the shortest time interval between applications. The frequency at which actual uses approach this maximum use scenario may be dependant on insecticide resistance, timing of applications, cultural practices, and market forces.

2. Assumptions, Limitations and Uncertainties Related to Exposure For Aquatic Species

Aquatic Exposure Model

Extrapolating the risk conclusions from the standard pond scenario modeled by PRZM/EXAMS may either underestimate or overestimate the potential risks. Major uncertainties with the standard runoff scenario are associated with the physical construct of the watershed and representation of vulnerable aquatic environments for different geographic regions. The physicochemical properties (pH, redox conditions, etc.) of the standard farm pond are based on a Georgia farm pond. These properties are likely to be regionally specific because of local hydrogeologic conditions. However, the fate data indicated that myclobutanil was stable to hydrolysis and anaerobic soil conditions, thus the regional differences my due more to hydrology differences rather than environmental difference. Any alteration in water quality parameters may impact the environmental behavior of the pesticide. The farm pond represents a well mixed, static water body. Because the farm pond is a static water body (no flow through), it does not account for pesticide removal through flow through or accidental water releases. However, the lack of water flow in the farm pond provides an environmental condition for accumulation of persistent pesticides. The assumption of uniform mixing does not account for stratification due to thermoclines (e.g., seasonal stratification in deep water bodies). Additionally, the physical construct of the standard runoff scenario assumes a watershed to pond area ratio of 10. This ratio is recommended to maintain a sustainable pond in the Southeastern United States. The use of higher watershed to pond ratios (as recommended for sustainable ponds in drier regions of the United States) may lead to higher pesticide concentrations when compared to the standard watershed to pond ratio.

The standard pond scenario assumes that uniform environmental and management conditions exist over the standard 10 hectare watershed. Soils can vary substantially across even small areas, and thus, this variation is not reflected in the model simulations. Additionally, the impact of unique soil characteristics (e.g., fragipan) and soil management practices (e.g., tile drainage) are not considered in the standard runoff scenario. The assumption of uniform site and management conditions is not expected to represent some site-specific conditions. Extrapolating the risk conclusions from the standard pond scenario to other aquatic habitats (e.g., marshes, streams, creeks, and shallow rivers, intermittent aquatic areas) may either underestimate or overestimate the potential risks in those habitats.

There are limited monitoring studies for myclobutanil in freshwater environments and no studies in marine environments. In addition, the monitoring studies were not targeted to myclobutanil use areas. Therefore, the exposure of aquatic species to myclobutanil is based entirely on the modeled data. The output of models such as PRZM/EXAMS is dependent upon the quality of the environmental fate input parameters. The fate data are based on studies that may not be acceptable under current classification standards as they were conducted prior to 1986 before Good Laboratory Practice (GLP) standards and data requirements for registration were promulgated. In addition, the aerobic and anaerobic aquatic metabolism study requirements have not been met by the registrant. Therefore, the Agency assumed that the residues of concern are persistent (stable) for the exposure assessment.

3. Assumptions, Limitations and Uncertainties Related to Exposure for Terrestrial Species

a. Location of Wildlife Species

For this screening-level terrestrial risk assessment, a generic bird or mammal was assumed to occupy either the treated field or adjacent areas receiving myclobutanil at the treatment rate on the field. Actual habitat requirements of any particular terrestrial species were not considered, and it was assumed that species occupy, exclusively and permanently, the modeled treatment area. Spray drift model predictions suggest that this assumption leads to an overestimation of exposure to species that do not occupy the treated field exclusively and permanently.

b. Routes of Exposure

This screening-level assessment for spray applications of myclobutanil only considered dietary exposure. Other routes of exposure that were not considered in the assessment are incidental soil ingestion exposure, inhalation exposure, dermal exposure, and drinking water exposure.

Incidental soil ingestion exposure

This risk assessment does not consider incidental soil ingestion. Available data suggests that up to 15% of the diet can consist of incidentally ingested soil depending on the species and feeding strategy (Beyer et al., 1994). A simple first approximation of soil concentration of pesticide from spray application shows that ingestion of soil at an incidental rate of up to 15% of the diet would not increase dietary exposure.

Inhalation exposure

The screening risk assessment does not consider inhalation exposure. Such exposure may occur through three potential sources: (1) spray material in droplet form at the time of application (2) vapor phase pesticide volatilizing from treated surfaces, and (3) airborne particulate (soil, vegetative material, and pesticide dusts).

Available data suggest that inhalation exposure at the time of application is not an appreciable route of exposure for birds. According to research on mallards and bobwhite quail, respirable particle size in birds (particles reaching the lung) is limited to a maximum diameter of 2 to 5 microns. The spray droplet spectra covering the majority of pesticide application situations (AgDRIFT model scenarios for very-fine to coarse droplet applications) suggests that less than 1% of the applied material is within the respirable particle size.

Theoretically, inhalation of pesticide's active ingredient in the vapor phase may be another source of exposure for some pesticides under some exposure situations. However, volatilization of myclobutanil from water and soil surfaces is not expected; therefore, inhalation should not be an important exposure pathway.

The impact from exposure to dusts contaminated with the pesticide cannot be assessed generically because soil properties (chemical and physical), which impact the estimation of such exposures are highly site-specific.

Dermal Exposure

The screening assessment does not consider dermal exposure, except as it is indirectly included in calculations of RQs based on lethal doses per unit of pesticide treated area. Dermal exposure may occur through three potential sources: (1) direct application of spray to terrestrial wildlife in the treated area or within the drift footprint, (2) incidental contact with contaminated vegetation, or (3) contact with contaminated water or soil.

Data which address dermal exposure of wildlife to pesticides in a quantitative fashion are extremely limited. The Agency is actively pursuing

modeling techniques to account for dermal exposure via direct application of spray and by incidental contact with vegetation.

Drinking Water Exposure

The exposure of a target organism to a pesticide's active ingredient may be the result of consumption of surface water, groundwater or consumption of the pesticide in dew or other water on the surfaces of treated vegetation or in puddled water on treated fields. For the active ingredients of a pesticide there is a potential to dissolve in runoff and puddles on the treated field may contain the chemical.

c. Dietary Intake and Other Limitations of Oral Studies in Terrestrial Species

The avian acute oral study and the avian subacute dietary study each have limitations for estimating the risk to wild species exposed to pesticides in the environment. Both studies have a fixed exposure period and do not allow for differences in the responses of individuals to different durations of exposure. With the acute oral study, the chemical is administered in a single dose. This does not mimic wild bird exposure through multiple feedings. Also, it does not account for the effect of different environmental matrices on absorption rate into the gastrointestinal tract of the animal. With the acute dietary study, the endpoint is reported as the concentration mixed with food that produces a response rather than as the dose ingested. Although food consumption sometimes allows for estimation of a dose, calculations of the mg/kg/day are confounded by undocumented spillage of feed and how consumption is measured over the duration of the test. Usually, if measured at all, food consumption is estimated once at the end of the five-day exposure period. Group housing of birds undergoing testing allows for a measure of only the average consumption per day for a group, and consumption estimates can be further confounded if birds die within a treatment group. In addition, the dietary study utilizes young birds. The exponential growth of young birds complicates the estimate of the dose; controls often nearly double in size over the duration of the test. Since weights are only taken at the initiation and at the end of the exposure period, the dose per body weight (mg/kg) is difficult to estimate with any precision. The interpretation of this test can be further confounded by dietary consumption. Estimation of the acute LC_{50} value is not only a function of the intrinsic toxicity of the pesticide, but also the willingness of the birds to consume treated food.

In addition to the uncertainties associated with the two toxicity studies utilized for estimating acute risk to birds, other factors, not normally taken into account in a screening level risk assessment may narrow the differences between the dose-based and dietary-based acute RQs for birds. The factors include differences in gross energy and assimilative efficiency of laboratory feed versus food items in the field, basic maintenance metabolic rates between wild birds and captive birds, seasonal free living dietary requirements for wild birds (including gorging behavior) and specific food avoidance behavior. These uncertainties may either overestimate or underestimate the risk in a screening level assessment.

Gross Energy and Assimilative Efficiency. This screening level risk assessment does not allow for gross energy and assimilative efficiency differences between wildlife food items and laboratory feed. For example, a typical laboratory avian feed, as used, contains approximately 2750 kcal/ kg. The Agency's Wildlife Exposure Factors Handbook (U.S. Environmental Protection Agency, 1993) presents the following dry-weight and fresh weight caloric contents for selected wildlife food items:

Food Item	Energy Dry (kcal/kg)	Energy Fresh (kcal/kg)
grasses	4200	1300
broadleaf forage	4200	2200
seeds	5100	4700
fruits	2000	1100
insects	5600	1600

On gross energy content alone, direct comparison of a laboratory dietary concentration-based effects threshold to a fresh-weight pesticide residue estimate would result in an underestimation of field exposure by food consumption by a factor of 1.25 - 2.5 for most food items. Only for seeds would the direct comparison of dietary threshold to residue estimate lead to an overestimate of exposure.

Depending upon species and dietary matrix, bird assimilation of wild diet energy ranges from 23 - 80%, and mammal's assimilation ranges from 41 - 85% (U.S. Environmental Protection Agency, 1993). If it is assumed that laboratory chow is formulated to maximize assimilative efficiency (e.g., a value of 85%), a potential for underestimation of exposure may exist by assuming that consumption of food in the wild is comparable with consumption during laboratory testing.

Metabolic Rates. In the screening process, exposure may be underestimated because metabolic rates are not related to food consumption. For example, the Wildlife Exposure Factors Handbook (U.S. Environmental Protection Agency, 1993) includes allometric models for estimating both existing metabolic rate (EMR) and free living metabolic rate (FMR). EMR is the metabolic rate necessary for animal maintenance in captivity without body weight loss, a condition similar to caged test animals. FMR is the energy requirement for an organism in the wild. For passerine birds these relationships are as follows:

$$\text{EMR (kcal/day)} = 1.572\ (\text{body weight g})^{0.6210}$$
$$\text{FMR (kcal/day)} = 2.123\ (\text{body weight g})^{0.749}$$

Using a weight range for passerines of 10 - 150 g, the EMR predictions range from 6.6 to 35.3, and the FMR ranges from 11.9 to 90.5 kcal/day. Thus, it appears that not accounting for increased energy demands of organisms in the wild when comparing dietary residues to dietary toxicity thresholds represents about a two-fold underestimation in exposure potential.

Free Living Metabolic Requirements. The screening procedure does not account for situations where the feeding rate may be above or below requirements to meet free living metabolic

requirements. Gorging behavior is a possibility under some specific wildlife scenarios (e.g., bird migration) where the food intake rate may be greatly increased. Kirkwood (1983) has suggested that an upper-bound limit to this behavior might be the typical intake rate multiplied by a factor of 5.

Avoidance. In contrast is the potential for avoidance, operationally defined as animals responding to the presence of noxious chemicals in their food by reducing consumption of treated dietary elements. This response is seen in nature where herbivores avoid plant secondary compounds. For agrochemicals, Dolbeer *et al.* (1994) reported that the use of methiocarb on fruit crops reduced depredation by birds. Of course, chemical treatment of food sources and any subsequent avoidance of those food sources by a species may, in itself, result in detrimental effects on the energetics of the species.

d. Incidental Releases Associated With Use

This risk assessment was based on the assumption that the entire treatment area is subject to pesticide application at the rates specified on the label. Uneven application of the pesticide through changes in calibration of application equipment, spillage, and localized releases at specific areas of the treated field that are associated with specifics of the type of application equipment were not accounted for in this assessment.

e. Residue Levels Selection

The Agency relies on the work of Fletcher et al. (1994) for setting the assumed pesticide residues in wildlife dietary items. These residue assumptions are believed to reflect a realistic upper-bound residue estimate, although the degree to which this assumption reflects a specific percentile estimate is difficult to quantify. It is important to note that the field measurement efforts used to develop the Fletcher estimates of exposure involve highly varied sampling techniques. It is entirely possible that much of these data reflects residues averaged over the entire above ground plants in the case of grass and forage sampling. Depending upon a specific wildlife species' foraging habits, whole aboveground plant samples may either underestimate or overestimate actual exposure.

f. Terrestrial Exposure Model

At this time, the T-REX model cannot accurately estimate terrestrial exposure levels with pesticides applied with varying application rates and application intervals. The technology is not yet available for these types of estimations.

4. Assumptions, Limitations and Uncertainties Related to Effects Assessment

a. Data Gaps

Ecotoxicity Studies on the Parent

The ecotoxicity database on the parent is not complete. Chronic studies on freshwater and marine/estuarine invertebrates and fish and studies on aquatic vascular plants and terrestrial plants are not available. The chronic study on marine/estuarine fish is not required at this time due to low acute toxicity, the availability of a chronic study on freshwater fish and likely low potential for risk. A chronic study on marine/estuarine invertebrates is required because myclobutanil is highly acutely toxic to marine/estuarine invertebrates and no chronic studies are available for freshwater invertebrates. A chronic study on freshwater invertebrates is not required if a chronic study on estuarine/marine invertebrates is conducted. Myclobutanil is not very acutely toxic to freshwater invertebrates. Studies on aquatic vascular plants are not available. One study on nonvascular plants indicates that myclobutanil is probably not very toxic to nonvascular aquatic plants. Incident data for terrestrial plants indicate that myclobutanil may damage terrestrial plants; however, the labels permit use around agricultural crops, thus limiting its use if any damage to crops occurs. Therefore, toxicity studies on aquatic vascular plants are not required at this time. There is an uncertainty associated with risk to terrestrial plants because of the incidence reports of damage to terrestrial plants. However, as stated, the permitted use around agricultural crops would limit the use if crop damage were observed.

End-Use Product Toxicity

No ecotoxicity data on any formulations have been submitted for birds, fish, plants or invertebrates. Acute oral toxicity data with the rat are available for several myclobutanil formulations. As stated previously, with the exception of the 60 DF formulation, the myclobutanil formulations are not more acutely toxic to rats than the technical material. The current estimated acute mammalian risks with the technical material are protective of any estimated acute mammalian risks utilizing the acute rat endpoint for the 60 DF formulation. However, an uncertainty remains as to whether or not the 60 DF formulation would be more acutely toxic than the technical material in the mouse. No chronic ecotoxicity data are available for any formulations. This adds uncertainty to the assessment. For birds and mammals, the toxicity data on the parent are used for estimating risk.

Degradate Toxicity

Mammalian acute toxicity and reproduction data are available for the 1,2,4-triazole degradate. The acute LD_{50}'s for the parent compound are 1600 mg/kg for rats and 1360 mg/kg for mice. For the degradate, they are 1648 mg/kg for rats and 3650 mg/kg for mice. The NOAEC/LOAECs for rat reproduction studies of the parent versus the degradate are 200/1000

ppm and 250/500 ppm, respectively. These data indicate that for the mammalian toxicity endpoints, the 1,2,4-triazole degradate is equally toxic as the parent. No ecotoxicity data on the degradate are available for either aquatic organisms or other terrestrial organisms. For fish and aquatic invertebrates, EECs on both the parent and the 1,2,4-triazole degradate were used for estimating risk. Total residues were not included in the terrestrial exposure values. Instead, the exposure values for the degradate were estimated separately and the potential additional risk to mammals was discussed in the risk description.

b. Sublethal Effects

For an acute risk assessment, the screening risk assessment relies on the acute mortality endpoint as well as a suite of sublethal responses to the pesticide, as determined by the testing of species response to chronic exposure conditions and subsequent chronic risk assessment. Consideration of additional sublethal data in the assessment is exercised on a case-by-case basis and only after careful consideration of the nature of the sublethal effect measured and the extent and quality of available data to support establishing a plausible relationship between the measure of effect (sublethal endpoint) and the assessment endpoints.

c. Age Class and Sensitivity of Effects Thresholds

Testing of juvenile organisms may overestimate toxicity at older age classes for pesticidal active ingredients that act directly (without metabolic transformation) because younger age classes may not have the enzymatic systems associated with detoxifying xenobiotics. However, the influence of age may not be uniform for all compounds, and compounds requiring metabolic activation may be more toxic in older age classes. The risk assessment uses the most sensitive life-stage information as the conservative screening endpoint.

d. Use of Most Sensitive Species Tested

Screening risk assessment relies on a selected toxicity endpoint from the most sensitive species tested; however, the selected toxicity endpoints do not necessarily reflect sensitivity of the most sensitive species in a given environment. The relative position of the most sensitive species tested in the distribution of all possible species is a function of the overall variability among species to a particular chemical. Toxicity thresholds may vary up to four orders of magnitude across species for some chemicals[1]. Therefore, risk conclusions may under- or overestimate actual ecological risk for a given species.

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[1] Mayer, F.L. and M.R. Ellersieck, 1986. Manual of acute toxicity: Interpretation and data base for 410 chemicals of freshwater animals. Resource Publication 160. U. S. Fish and Wildlife Service. Department of the Interior, Washington, D.C., 579 p.

5. Assumptions, Limitations, Uncertainties, Strengths and Data Gaps Related to the Acute and Chronic LOC's

The risk characterization section of the assessment document includes an evaluation of the potential for individual effects to listed species at an exposure level equivalent to the LOC. This evaluation is based on the median lethal dose estimate and dose/response relationship established for the effects study corresponding to each taxonomic group for which the LOCs are exceeded. The slope of the probit-dose response is used to generate a probability of individual effects near the low end tail of the curve. Predictions based on low probability events are by nature highly uncertain. Moreover, for this assessment the dose-response curve representing a given taxa is generated from one study using one species. It is likely that the resulting dose-response relationship does not represent the response of all species within a taxa. Calculating the probability of individual effects at the lower and upper bounds of the slope is designed to address this source of uncertainty but the extent to which this captures the variability within a taxa is unknown. In some cases, a probit dose-response relationship cannot be calculated. In these instances, event probabilities are calculated based on a default slope assumption of 4.5 (Urban and Cook, 1986).

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VI. Appendices

A. Data Requirement Table
B. Environmental Fate Data
C. Aquatic Exposure Model and Results
D. Ecological Effects Data
E. Risk Quotient Method and Levels of Concern
F. Incidence Summary Reports (A and B)
G. Terrestrial Risk: T-REX Tables
H. Summary of Endangered/Threatened Species (LOCATES)
I. Ecotoxicity and Environmental Fate Bibliography

Appendix A: Data Requirement Tables

Environmental Fate and Effects

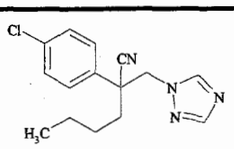
TABLE A-1: of Environmental Fate Data Requirements				
Guideline #	**Data Requirement (material)**	**MRID #**	**Study Classification**	**Are more data needed?**
161-1	Hydrolysis	00141679	Acceptable	No
161-2	Photodegradation in Water	40641501 40319801 40528801	Acceptable	No
161-3	Photodegradation on Soil	00164988	Acceptable	No
161-4	Photodegradation in Air	No data	N/A	No
162-1	Aerobic Soil Metabolism	00164561	Acceptable	No
162-2	Anaerobic Soil Metabolism	No MRID available	Acceptable	No
162-3	Anaerobic Aquatic Metabolism (benthic)	No data	N/A	Yes - Need estimate of persistence in water
162-4	Aerobic Aquatic Metabolism	No data	N/A	Yes - Need estimate of persistence in water
163-1	Leaching-Adsorption/Desorption	00141682	Acceptable	No
163-2	Laboratory Volatility	No data	N/A	No
163-3	Field Volatility	No data	N/A	No
164-1	Terrestrial Field Dissipation	00164563	Acceptable	No
164-2	Aquatic Field Dissipation	No data	N/A	No
164-3	Forestry Dissipation	No data	N/A	No
165-4	Accumulation in Fish	00162541	Acceptable	No
165-5	Accumulation- aquatic non-target	No data	N/A	No
166-1	Ground Water- small prospective	No data	N/A	No
166-2	Groundwater – small retrospective	No data	N/A	No
201-1	Droplet Size Spectrum	No data	N/A	No
202-1	Drift Field Evaluation	No data	N/A	No

Ecological Toxicity Data

TABLE A-2: Ecological Toxicity Data Requirements				
Guideline #	**Data Requirement**	**MRID #**	**Classification**	**Are more data needed?**
71-1	Avian acute oral LD_{50} (bobwhite quail)	00144286	Acceptable	No. Bird reproduction studies not tested at sufficiently high concentration levels. No studies required at this time because LOAEC is higher than the concentration levels applied for proposed uses.
71-2	Avian subacute dietary LC_{50} (bobwhite quail) (mallard duck)	00144287 00144288	Acceptable	
71-4	Avian reproduction (bobwhite quail) (mallard duck)	43087901 43087902	Supplemental	
72-1	Freshwater fish acute LC_{50} (rainbow trout) (bluegill sunfish)	00141677 00144285	Acceptable Acceptable	No
72-2	Freshwater invertebrate acute EC_{50} (daphnia)	00141678	Acceptable	
72-3a	Estuarine/marine fish acute LC_{50} (sheepshead minnow)	42747903	Acceptable	
72-3b	Estuarine/marine invertebrate acute EC_{50} (eastern oyster) (mysid shrimp)	42747901 42747902	Supplemental Acceptable	
72-4a	Freshwater fish early life stage (fathead minnow)	00164986 40409201 40480401	Acceptable	No
72-4b	Freshwater invertebrate life cycle (daphnia)	N/A	Not available	No if acceptable 72-4c submitted Yes – highly acutely toxic, no 72-4a study and marine/estuarine exposure expected
72-4c	Estuarine/marine life cycle (mysid)	N/A	Not available	
72-5	Freshwater fish life cycle (fathead minnow)	N/A	Not available	No
72-7	Aquatic Field Study	N/A	Not available	No
81-1	Acute mammalian oral LD_{50} (rat)	00165239	Acceptable	No
83-4	Mammalian Reproduction	00149581	Acceptable	No

TABLE A-2: Ecological Toxicity Data Requirements				
Guideline #	**Data Requirement**	**MRID #**	**Classification**	**Are more data needed?**
	(rat)	00143766		
123-1(a)	Seedling Emergence	N/A	Not available	No - Incidence data indicate potential damage to terrestrial plants. The fact that myclobutanil is labeled for use around agricultural crops indicates that toxicity to plants may not be sufficiently high to indicate a concern.
123-1(b)	Vegetative Vigor	N/A	Not available	
122-2	Aquatic plant algae *Selenastrum capricornutum*	41984801	Acceptable	No - Study on aquatic non-vascular plants indicates that myclobutanil probably not toxic to this taxa. Although incidence data for terrestrial plants indicate that myclobutanil may damage terrestrial plants, the labels permit use around agricultural crops. Any damage to crops naturally limit the use.
123-2	Aquatic plant acute EC_{50} *Lemna gibba*	N/A	Not available	
141-1	Acute honey bee contact LD_{50} Acute honey bee 5-day oral LD_{50}	N/A	Not available	No – non-guideline dust study on bees indicates that myclobutanil not toxic to honey bees
141-2	Honey Bee Residue on Foliage	N/A	Not available	

Appendix B:
Environmental Fate Data

Appendix B. Table 1. Selected Fate and Transport data for Myclobutanil.		
Parameter	Input Value and Unit	Source
Chemical Formula Myclobutanil: alpha-butyl-alpha (4-chlorophenyl)-1H-1,2-triazole-1-propane-nitrile		
Chemical Structure: **Myclobutanil**		
Molecular Weight	288.8 g/ mol	DP Barcode D289700 (6/25/03)
Solubility in Water (pH 7, 20°C)	142 mg/L	DP Barcode D289700 (6/25/03)
161-1 Hydrolysis at pH 5,7, and 9	Stable	MRID 001416-79
161-2 Aqueous Photolysis (T½)	Stable	MRID # 406415-01, 403198-01, 405288-01
161-3 Soil Photolysis	143 days	Acc# 266121, 214084 (D197478)
163-1 Partition Coefficient, K_{ads} [a]	1.46, 2.39, 4.44, 7.08, 9.77 mL/g	MRID# 141602
162-1 Aerobic Soil Metabolism (T½)[b]	198, 224 days	MRID# 164561
162-3 Anaerobic Soil Metabolism	Assume Stable, No appreciable degradation in 62 days	DP Barcode D289700 (6/25/03)
162-3 Anaerobic Aquatic Metabolism	No Data Submitted	
162-4 Aerobic Aquatic Metabolism	No Data Submitted	
164-1 Terrestrial Field Dissipation	92 to 292 days	MRID # 164563

[a] Kocs are presented in Appendix B, Table 3.

[b] (T½) – Myclobutanil decline does not follow first-order kinetics, therefore the decay rate is not truly a half-life. Estimate of DT_{50} or half-life is dependant upon method used to determine value.

Input Parameters

Model input parameters were estimated from the fate and transport properties given Table 3 and the other default values are prepared or selected as recommended by EFED Input Guidance document (USEPA, 2002). Pesticide usage information was obtained from the draft labels. The inputs values used in FIRST and SCI-GROW models are summarized in Table 4.

The models currently used by EFED, assume that the degradation follow first order kinetics, and therefore require an estimate of the half-life. Myclobutanil degradation, however, is best described using a hockey stick degradation pattern. This type of

degradation pattern cannot be modeled using first-order kinetics.

The previously reported half-lives for myclobutanil cite a range of between 61 and 71 days (D289700), which described the decline reasonably well for the first 90 days of the study, but grossly overestimates the remaining decline. The method used to estimate these half-lives was not stated, but it appears that only the first 90 (or less) days of a 367 day study were used. EFED reevaluated the data and re-estimated the decline rate constants utilizing all the data for myclobutanil (see discussion in Appendix B and Appendix B, Tables 1 and 2).

The linear regression of the log-normal transformed myclobutanil radioactivity provided the best estimate of the measured residues (as percent of applied radioactivity) versus time (e.g., 29 to 33% myclobutanil) remaining at 367 days. The study was not conducted long enough to observe a DT_{75} or DT_{90}. The 90-percent upper bound of the mean (n=2) aerobic soil metabolism half-life for myclobutanil was estimated to be 251 days. Additionally, the models currently used by EFED were not developed for a persistent chemical where accumulation might occur.

Analysis of the sorption data (Appendix B, Tables 3) indicate sorption is not significantly correlated with organic matter (carbon) (EAB# 6087. 03/05/86). Therefore, lowest non-sand Freundlich K_{ads} was used to estimate the EDWCs for myclobutanil (USEPA, 2002).

The aerobic aquatic metabolism half-life was assumed to be twice that of the aerobic soil metabolism half-life estimated as a model input (USEPA, 2002).

Appendix B. Table 2. Input parameters for the Models used in Myclobutanil Water Exposure Assessment		
Input	**Value**	**Rationale**
Application rate/number/interval	0.25 lb a.i.A^{-1} /8/14 days	Maximum proposed label use
Incorporation depth	0	USEPA, 2002
Hydrolysis	0 (stable)	USEPA, 2002
Aquatic Photodegradation	0 (stable)	USEPA, 2002
Solubility	142.0 mg/L	USEPA, 2002
Aerobic Soil Metabolism Myclobutanil	251 days	= Upper 90th bound on mean
Aerobic Aquatic Metabolism Myclobutanil	*Estimated as* 502 days	= 2 x ASM per USEPA, 2002
Anaerobic Aquatic Metabolism	0 Stable	= Assumed stable to be conservative
Mobility (Freundlich K_{ads}) Myclobutanil	2.39 mL/g	GENEEC, PRZM/EXAMS = Lowest non-sand value
Mobility (Koc) Myclobutanil	224	For SCI-GROW1 = Lowest Koc
Aerial Spray Drift Ground Spray Drift	0.05 (fraction) 0.01 (fraction)	USEPA, 2002
Application Efficiency (APPEFF) Aerial Ground	 0.95 (fraction) 0.99 (fraction)	USEPA, 2002
Wetted In	No	Label

[1] SCI-GROW input specifies a Koc rather than K_{ads} as an input value.

Appendix 1. Additional Environmental Fate Discussion

The method used to determine the aerobic soil metabolism (MRID 164561) half-lives reported in earlier DERs could not be replicated. The pattern of decline appears to fit the common degradation pattern termed the "hockey stick". An analysis of degradation kinetics was conducted to derive the best description of the measured decline curves in aerobic soil metabolism studies. The entire data set (0 to 367 days) and a portion of the data (0 to 90 days) were analyzed using linear regression of the ln-transformed data and non-linear regression of the untransformed data.

The following equations and assumptions were made (based upon draft guidance being developed by the Fate Tech Team, Eckel, 1/2007.

Eq 1. $dC/dt = -kC^n$

if n=1, then $\ln(C_0/C) = -kt$ (first order equation)

if $n \neq 1$ then

Eq. 2. $(1/(n-1))*((1/C^{n-1}) - (1/C_0^{n-1})) = -kt$

C =((n-1)*k*t + (1/co^(n-1)))^(-1/(n-1)); co = Co/100

The rings of myclobutanil, triazole and chlorophenyl rings were labeled [^{14}C], thus, the decline (of radioactivity) of myclobutanil was measured by each ring. The formation and decline of 1,2,4-triazole could also be tracked with the triazole ring.

Assuming first-order kinetics (eq. 1) a half-life ($T_{½}$) was calculated using linear regression on the ln-transformed concentration versus time (time = 0 to 90 days or time = 0 to 367) and a DT_{50} was calculated using non-liner regression (the Levenberg-Marquardt least squares method for curve fitting) of concentration versus time (time = 0 to 90 days or time = 0 to 367). The decay rate (k, or slope) and R^2 are summarized in Appendix 2, Table 1.

The second equation (Eq 2.) result using all the data (0 to 367 days) fit the data points (Levenberg-Marquardt least squares), but was not a first order.

Appendix 1, Table 1. Summary of regression method, time, decay rate, coefficient of determination (R^2), intercept, and reaction order.

Parent (myclobutanil)					
Regression		Time (days)	k	R^2	n
Linear	lnc = lnCo exp (-kt)	90	0.0096[a] 0.0077[b]	0.99 0.97	1 1
Linear		367	0.0035 0.0031	0.81 0.82	1 1
Nonlinear	C=CoExp(-kt)	90	0.10 0.0091	0.99 0.95	1 1
		367	0.0067 0.0058	0.83 0.77	1 1
Nonlinear-N[st] order	C[c]	367	0.01676	0.98	n = 2.929 co = 1.012
Myclobutanil + 1,2,4-triazole					
Regression	lnc = lnCo exp (-kt)	Time (days)			
Linear		90	0.0058[a]	0.96	1
Linear		367	0.0022	0.85	1
Nonlinear	C=CoExp(-kt)	90	0.0069	0.92	1
Nonlinear		367	0.0037	0.68	1
Nonlinear-N[st] order	C[c]	367	0.01434	0.978	n = 4.789 co = 0.978

[a] Triazole ring labeled will include 1,2,4-triazole.

[b] Chlorophenyl ring label.(1,2,4-triazole not label)

°C =((n-1)*k*t + (1/co^(n-1)))^(-1/(n-1)); co = Co/100

Appendix 1, Table 2 summarizes the distribution of measured radioactivity, and the estimated half-life or DT_{50}, DT_{75}, and 367 days (end of study). The rate constant (k /day) and coefficient of determination (R^2) is also shown. From a statistical stand point (the linear and nonlinear methods) were significant (slopes) and the R^2 were fair to good, and therefore, acceptable. But in reality the linear or nonlinear methods did not fit the data very well. Either the method it fit the data well at times less than 90 days, but not at day 367 or more, or it fit at both ends, but not in the middle.

The non-linear, n-order curve fitting equation (eq. 2) fit the data also exactly. Unfortunately, it is not a first-order equation.

In summary, neither the first-order linear regression nor nonlinear regression (curve fitting) gives totally satisfactory results. When only part of the data is used the initial decline can be fit quite well, but the later data is underestimated. Using all the data, over estimated the half-life (or DT_{50}), but under estimated the DT_{70} or DT_{90}. The first-order linear regression (transform data), using all the data, was the only method that gave a reasonable estimate of the residue remaining at the end of the study (367). Neither DT_{75} or DT_{90} were reached in the study, the residues remaining at day 367 was used to evaluate the results. This was selected because it was the most conservative as it fit the data best at both the beginning and end of the study. This would result in a conservative estimate of myclobutanil concentrations in water.

Appendix 1, Table 2. Summary of half-lives, DT50, DT75, DT90, and decay rate of myclobutanil and myclobutanil + 1,2,4 triazole estimated by linear and non-linear regression.

	Half-life or DT50	DT75	DT90	% Radioactivity at 367 days	Rate constant	Coefficient of Determination
PARENT ONLY	50% decline	75% decline	90% decline			
Triazole Label Position	Time (days)				$Days^{-1}$	R^2
Observed Mycobutanil	75	>365	>365	29		
Liner Regression (t <100 days)	72.2	144	239	3.0	0.0096	0.99
Linear Regression (all)	**198.0**	**396**	**657**	**27.9**	**0.0035**	**0.81**
Nonlinear 1st order (t <100 days)	69.3	138	230	2.6	0.010	0.99
Nonlinear 1st order	103.5	206	343	8.7	0.0067	0.83
Nonlinear nst order	87.6	400	2600	26.7	0.0167	0.98
Observed Chlorophenyl Label	90	>365	>365	33		
Liner Regression (t <100 days)	90	180	299	6.0	0.0077	0.97
Linear Regression (all)	**224**	**447**	**742**	**32.3**	**0.0031**	**0.82**
Nonlinear 1st order (t<100 days)	76	152	253	3.6	0.0091	0.95
Nonlinear 1st order	113	237	354	11.6	0.0059	0.77
Nonlinear nst order	103	630	>1000	31.2	0.0164	0.98
PARENT + DEGRADATE						
Observed Myclobutanil + 1,2,4 triazole	220	>365	>365	42		
Liner Regression (t <100 days)	119.5	239	397	12.0	0.0058	0.96
Linear Regression (all)	315.1	630	1047	44.8	0.0022	0.85
Nonlinear 1st order (t<100 days)	100.5	201	334	8.1	0.0069	0.92
Nonlinear 1st order	186.3	372	619	25.9	0.0037	0.68
Nonlinear nst order	235.2			44.85	0.0144	0.98

Adsorption/Desorption Data Summary

The sorption and desorption data for myclobutanil are summarized in Appendix B, Table 3.

Appendix 1, Table 3 Textural class, Organic Matter, Freundlich K_{ads}, Koc, and Desorption (MRID # 141682).					
Myclobutanil					
MRID 141602	Texture Class	OM%	K_{ads} mL/g	Koc[1] $ml/g_{soil\ carbon}$	K_{des}
	Clay	0.44	2.39	936	0.588
	Sand	0.95	1.46	265	0.468
	Silty loam	2.05	7.08	595	4.178
	Sandy loam	2.9	9.77	581	4.082
	Clay loam	3.42	4.44	224	1.186

[1]Koc = (K_d/(%OM/1.724)) * 100 where K_{ads} is assumed to equal to K_d and OC% = OM%/1.724

The sorption and desorption data for 1,2,4-triazole are summarized in Appendix B, Table 4

Appendix 2, Table 4 (MRID # 40891501)					
1,2,4-Triazole					
MRID 408915-01	Texture Class	OM%	K_{ads} mL/g	Koc[1] $ml/g_{soil\ carbon}$	K_{des}
	Sand	0.2	0.234	202	0.61
	Silty clay loam	1.2	0.722	104	0.82
	Silty clay	1.2	0.833	120	2.13
	Sandy loam	1.4	0.719	89	1.14
	Clay loam	3.0	0.748	43	1.07

[1]Koc = (K_d/(%OM/1.724)) * 100 where K_{ads} is assumed to equal to K_d and OC% = OM%/1.724

Appendix C
Aquatic Exposure Model Outputs and Monitoring Data Summary

1. Tier I GENEEC OUTPUT

TROPICAL FRUIT

8 applications at 0.25 lb a.i./A per application, 14 day interval
Parent - 90 percent upper bound on mean, lowest non sand kd, no aquatic degradation

RUN No. 1 FOR myclobutanil ON tropical f * INPUT VALUES *

RATE (#/AC) ONE(MULT)	No.APPS & INTERVAL	SOIL Kd (PPM)	SOLUBIL (%DRIFT)	APPL TYPE ZONE(FT)	NO-SPRAY (IN)	INCORP
.250(1.754)	8 14	2.4	142.0	AERL_B(13.0)	.0	.0

FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)

METABOLIC (FIELD)	DAYS UNTIL RAIN/RUNOFF	HYDROLYSIS (POND)	PHOTOLYSIS (POND-EFF)	METABOLIC (POND)	COMBINED (POND)
251.00	2	N/A	.00- .00	.00	.00

GENERIC EECs (IN MICROGRAMS/LITER (PPB)) Version 2.0 Aug 1, 2001

PEAK GEEC	MAX 4 DAY AVG GEEC	MAX 21 DAY AVG GEEC	MAX 60 DAY AVG GEEC	MAX 90 DAY AVG GEEC
82.91	*82.82*	*82.25*	*81.01*	*80.10*

Tropical Fruit

8 applications at 0.25 lb a.i./A per application, 14 day interval
Parent - 90 percent upper bound on mean, lowest non sand kd, with aquatic degradation

RUN No. 1 FOR myclobutanil ON tropical f * INPUT VALUES *

RATE (#/AC) ONE(MULT)	No.APPS & INTERVAL	SOIL Kd (PPM)	SOLUBIL (%DRIFT)	APPL TYPE ZONE(FT)	NO-SPRAY (IN)	INCORP
.250(1.754)	8 14	2.4	142.0	AERL_B(13.0)	.0	.0

FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)

METABOLIC DAYS UNTIL HYDROLYSIS PHOTOLYSIS METABOLIC COMBINED
(FIELD) RAIN/RUNOFF (POND) (POND-EFF) (POND) (POND)

251.00 2 N/A .00- .00 502.00 502.00

GENERIC EECs (IN MICROGRAMS/LITER (PPB)) Version 2.0 Aug 1, 2001

PEAK GEEC	MAX 4 DAY AVG GEEC	MAX 21 DAY AVG GEEC	MAX 60 DAY AVG GEEC	MAX 90 DAY AVG GEEC
82.28	*82.10*	*81.02*	*78.63*	*76.89*

Okra

okra 0.125 lb ai/ac 4 times 10 day interval
90 percent upper bound mean asm, kd lowest non sand, no aquatic degradation

RUN No. 1 FOR myclobutanil ON okra * INPUT VALUES *

RATE (#/AC) No.APPS & SOIL SOLUBIL APPL TYPE NO-SPRAY INCORP
ONE(MULT) INTERVAL Kd (PPM) (%DRIFT) ZONE(FT) (IN)

.125(.480) 4 10 2.4 142.0 AERL_B(13.0) .0 .0

FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)

METABOLIC DAYS UNTIL HYDROLYSIS PHOTOLYSIS METABOLIC COMBINED
(FIELD) RAIN/RUNOFF (POND) (POND-EFF) (POND) (POND)

251.00 2 N/A .00- .00 .00 .00

GENERIC EECs (IN MICROGRAMS/LITER (PPB)) Version 2.0 Aug 1, 2001

PEAK GEEC	MAX 4 DAY AVG GEEC	MAX 21 DAY AVG GEEC	MAX 60 DAY AVG GEEC	MAX 90 DAY AVG GEEC
22.35	*22.32*	*22.17*	*21.83*	*21.58*

Okra

Okra 0.125 lb ai/ac 4 times 10 day interval

90 percent upper bound mean asm, kd lowest non sand, with aquatic degradation

RUN No. 3 FOR myclo ON okra * INPUT VALUES *

RATE (#/AC) ONE(MULT)	No.APPS & INTERVAL	SOIL Kd (PPM)	SOLUBIL (%DRIFT)	APPL TYPE ZONE(FT)	NO-SPRAY (IN)	INCORP
.125(.480)	4 10	2.4	142.0	AERL_B(13.0)	.0	.0

FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)

METABOLIC (FIELD)	DAYS UNTIL RAIN/RUNOFF	HYDROLYSIS (POND)	PHOTOLYSIS (POND-EFF)	METABOLIC (POND)	COMBINED (POND)
251.00	2	N/A	.00- .00	502.00	502.00

GENERIC EECs (IN MICROGRAMS/LITER (PPB)) Version 2.0 Aug 1, 2001

PEAK GEEC	MAX 4 DAY AVG GEEC	MAX 21 DAY AVG GEEC	MAX 60 DAY AVG GEEC	MAX 90 DAY AVG GEEC
22.28	*22.23*	*21.93*	*21.29*	*20.81*

ARTICHOKES

6 applications at 0.10 lb a.i./A, 14 day interval, 90 percent upper bound mean asm, kd lowest non sand, no aquatic degradation

RUN No. 3 FOR myclobutanil ON artichoke * INPUT VALUES *

RATE (#/AC) ONE(MULT)	No.APPS & INTERVAL	SOIL Kd (PPM)	SOLUBIL (%DRIFT)	APPL TYPE ZONE(FT)	NO-SPRAY (IN)	INCORP
.100(.546)	6 14	2.4	142.0	AERL_B(13.0)	.0	.0

FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)

METABOLIC (FIELD)	DAYS UNTIL RAIN/RUNOFF	HYDROLYSIS (POND)	PHOTOLYSIS (POND-EFF)	METABOLIC (POND)	COMBINED (POND)

251.00	2	N/A	.00-	.00	.00	.00

GENERIC EECs (IN MICROGRAMS/LITER (PPB)) Version 2.0 Aug 1, 2001

PEAK GEEC	MAX 4 DAY AVG GEEC	MAX 21 DAY AVG GEEC	MAX 60 DAY AVG GEEC	MAX 90 DAY AVG GEEC
25.62	*25.59*	*25.42*	*25.03*	*24.75*

Artichokes

6 applications at 0.10 lb a.i./A, 14 day interval, 90 percent upper bound mean asm, kd lowest non sand, with aquatic degradation

RUN No. 4 FOR myclobutanil ON artichokes * INPUT VALUES *

RATE (#/AC) ONE(MULT)	No.APPS & INTERVAL	SOIL Kd	SOLUBIL (PPM)	APPL TYPE (%DRIFT)	NO-SPRAY ZONE(FT)	INCORP (IN)
.100(.546)	6 14	2.4	142.0	AERL_B(13.0)	.0	.0

FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)

METABOLIC (FIELD)	DAYS UNTIL RAIN/RUNOFF	HYDROLYSIS (POND)	PHOTOLYSIS (POND-EFF)	METABOLIC (POND)	COMBINED (POND)
251.00	2	N/A	.00-	.00	502.00	502.00

GENERIC EECs (IN MICROGRAMS/LITER (PPB)) Version 2.0 Aug 1, 2001

PEAK GEEC	MAX 4 DAY AVG GEEC	MAX 21 DAY AVG GEEC	MAX 60 DAY AVG GEEC	MAX 90 DAY AVG GEEC
25.50	*25.44*	*25.11*	*24.37*	*23.83*

LETTUCE

3 crops with 4 applications at 0.124 lb a.i./A per crop, 14 day interval, 90 percent upper bound mean asm, kd lowest non sand, no aquatic degradation

RUN No. 1 FOR myclobutanil ON lettuce * INPUT VALUES *

RATE (#/AC) ONE(MULT)	No.APPS & INTERVAL	SOIL Kd	SOLUBIL (PPM)	APPL TYPE (%DRIFT)	NO-SPRAY ZONE(FT)	INCORP (IN)
.125(1.224)	12 14	2.4	142.0	AERL_B(13.0)	.0	.0

FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)

METABOLIC (FIELD)	DAYS UNTIL RAIN/RUNOFF	HYDROLYSIS (POND)	PHOTOLYSIS (POND-EFF)	METABOLIC (POND)	COMBINED (POND)
251.00	2	N/A	.00- .00	.00	.00

GENERIC EECs (IN MICROGRAMS/LITER (PPB)) Version 2.0 Aug 1, 2001

PEAK GEEC	MAX 4 DAY AVG GEEC	MAX 21 DAY AVG GEEC	MAX 60 DAY AVG GEEC	MAX 90 DAY AVG GEEC
58.55	58.48	58.09	57.21	56.57

Lettuce

3 crops with 4 applications at 0.124 lb a.i./A per crop, 14 day interval, 90 percent upper bound mean asm, kd lowest non sand, with aquatic degradation

RUN No. 1 FOR myclobutanil ON lettuce * INPUT VALUES *

RATE (#/AC) ONE(MULT)	No.APPS & INTERVAL	SOIL Kd	SOLUBIL (PPM)	APPL TYPE (%DRIFT)	NO-SPRAY ZONE(FT)	INCORP (IN)
.125(1.224)	12 14	2.7	142.0	AERL_B(13.0)	.0	.0

FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)

METABOLIC (FIELD)	DAYS UNTIL RAIN/RUNOFF	HYDROLYSIS (POND)	PHOTOLYSIS (POND-EFF)	METABOLIC (POND)	COMBINED (POND)
251.00	2	N/A	.00- .00	502.00	502.00

GENERIC EECs (IN MICROGRAMS/LITER (PPB)) Version 2.0 Aug 1, 2001

PEAK GEEC	MAX 4 DAY AVG GEEC	MAX 21 DAY AVG GEEC	MAX 60 DAY AVG GEEC	MAX 90 DAY AVG GEEC
56.41	*56.28*	*55.50*	*53.79*	*52.54*

TIER II PRZM/EXAMS SIMULATION OUTPUTS

CA - Artichokes - Air

stored as CAArtAir.out
Chemical: Myclobutanil
PRZM environment: CARowCropRLF.txt modified Tueday, 20 February 2007 at 12:04:10
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 16:33:30
Metfile: w23234.dvf modified Wedday, 3 July 2002 at 09:04:22
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	2.523	2.518	2.505	2.428	2.388	1.744
1962	5.549	5.538	5.494	5.41	5.265	4.18
1963	9.27	9.253	9.184	9.078	9.003	7.764
1964	10.2	10.19	10.13	10.04	9.971	9.193
1965	11.96	11.94	11.87	11.76	11.69	10.71
1966	12.67	12.65	12.58	12.46	12.39	11.69
1967	15.39	15.36	15.26	15.22	15.15	13.84
1968	15.41	15.39	15.3	15.2	15.11	14.13
1969	15.38	15.36	15.26	15.16	15.07	14.11
1970	15.88	15.86	15.75	15.66	15.56	14.41
1971	15.63	15.6	15.52	15.41	15.32	14.36
1972	15.1	15.08	15	14.88	14.8	13.97
1973	15.28	15.25	15.16	15.06	14.96	14.08
1974	16.57	16.55	16.45	16.35	16.27	15
1975	17.53	17.5	17.39	17.3	17.2	15.83
1976	16.91	16.89	16.79	16.69	16.6	15.57
1977	16.28	16.26	16.17	16.06	15.98	15.1
1978	17.4	17.37	17.26	17.11	16.94	15.71
1979	16.58	16.55	16.45	16.35	16.27	15.51
1980	17.31	17.29	17.19	17.09	17	15.94
1981	16.59	16.57	16.47	16.37	16.27	15.5
1982	19.34	19.31	19.21	19.12	19.01	17.46
1983	19.53	19.5	19.39	19.22	19.09	17.87
1984	18.32	18.29	18.18	18.09	17.98	16.96
1985	17.56	17.54	17.43	17.34	17.24	16.31
1986	17.04	17.01	16.91	16.81	16.72	15.78
1987	16.33	16.3	16.19	16.1	16	15.02
1988	17.12	17.1	16.98	16.88	16.73	15.38
1989	16.23	16.21	16.11	16.01	15.91	15.14
1990	16.79	16.77	16.65	16.39	16.25	15.28

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly	
0.032258064516129			19.53	19.5	19.39	19.22	19.09	17.87
0.0645161290322581			19.34	19.31	19.21	19.12	19.01	17.46
0.0967741935483871			18.32	18.29	18.18	18.09	17.98	16.96
0.129032258064516			17.56	17.54	17.43	17.34	17.24	16.31
0.161290322580645			17.53	17.5	17.39	17.3	17.2	15.94
0.193548387096774			17.4	17.37	17.26	17.11	17	15.83
0.225806451612903			17.31	17.29	17.19	17.09	16.94	15.78
0.258064516129032			17.12	17.1	16.98	16.88	16.73	15.71
0.290322580645161			17.04	17.01	16.91	16.81	16.72	15.57
0.32258064516129			16.91	16.89	16.79	16.69	16.6	15.51
0.354838709677419			16.79	16.77	16.65	16.39	16.27	15.5
0.387096774193548			16.59	16.57	16.47	16.37	16.27	15.38
0.419354838709677			16.58	16.55	16.45	16.35	16.27	15.28
0.451612903225806			16.57	16.55	16.45	16.35	16.25	15.14
0.483870967741936			16.33	16.3	16.19	16.1	16	15.1
0.516129032258065			16.28	16.26	16.17	16.06	15.98	15.02
0.548387096774194			16.23	16.21	16.11	16.01	15.91	15
0.580645161290323			15.88	15.86	15.75	15.66	15.56	14.41
0.612903225806452			15.63	15.6	15.52	15.41	15.32	14.36
0.645161290322581			15.41	15.39	15.3	15.22	15.15	14.13
0.67741935483871			15.39	15.36	15.26	15.2	15.11	14.11
0.709677419354839			15.38	15.36	15.26	15.16	15.07	14.08
0.741935483870968			15.28	15.25	15.16	15.06	14.96	13.97
0.774193548387097			15.1	15.08	15	14.88	14.8	13.84
0.806451612903226			12.67	12.65	12.58	12.46	12.39	11.69
0.838709677419355			11.96	11.94	11.87	11.76	11.69	10.71
0.870967741935484			10.2	10.19	10.13	10.04	9.971	9.193
0.903225806451613			9.27	9.253	9.184	9.078	9.003	7.764
0.935483870967742			5.549	5.538	5.494	5.41	5.265	4.18
0.967741935483871			2.523	2.518	2.505	2.428	2.388	1.744
0.1	18.244	18.215	18.105	18.015	17.906	16.895		

Average of yearly averages: 13.7847

Inputs generated by pe5.pl - Novemeber 2006

Data used for this run:
Output File: CAArtAir
Metfile: w23234.dvf
PRZM scenario: CARowCropRLF.txt
EXAMS environment file: pond298.exv
Chemical Name: Myclobutanil

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	288.8	g/mol	
Henry's Law Const.	henry		atm-m^3/mol	
Vapor Pressure	vapr		torr	
Solubility	sol	142	mg/L	
Kd	Kd	2.39	mg/L	
Koc	Koc		mg/L	
Photolysis half-life	kdp		days	Half-life
Aerobic Aquatic Metabolism	kbacw	502	days	Halfife
Anaerobic Aquatic Metabolism	kbacs		days	Halfife
Aerobic Soil Metabolism	asm	251	days	Halfife
Hydrolysis:	pH 7		days	Half-life
Method: CAM	2	integer	See PRZM manual	
Incorporation Depth:	DEPI		cm	
Application Rate:	TAPP	0.112	kg/ha	
Application Efficiency:	APPEFF	0.95	fraction	
Spray Drift	DRFT	0.05	fraction of application rate applied to pond	
Application Date	Date	1-3	dd/mm or dd/mmm or dd-mm or dd-mmm	
Interval 1	interval	14	days	Set to 0 or delete line for single app.
app. rate 1	apprate	0.112	kg/ha	
Interval 2	interval	14	days	Set to 0 or delete line for single app.
app. rate 2	apprate	0.112	kg/ha	
Interval 3	interval	14	days	Set to 0 or delete line for single app.
app. rate 3	apprate	0.112	kg/ha	
Interval 4	interval	14	days	Set to 0 or delete line for single app.
app. rate 4	apprate	0.112	kg/ha	
Interval 5	interval	14	days	Set to 0 or delete line for single app.
app. rate 5	apprate	0.112	kg/ha	
Record 17:	FILTRA			
IPSCND				
UPTKF				
Record 18:	PLVKRT			
PLDKRT				
FEXTRC	0.5			
Flag for Index Res. Run	IR	EPA Pond		
Flag for runoff calc.	RUNOFF	none	none, monthly or total(average of entire run)	

CA - Artichokes - Ground

stored as CAArtGRD.out
Chemical: Myclobutanil
PRZM environment: CARowCropRLF.txt modified Tueday, 20 February 2007 at 12:04:10
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 16:33:30
Metfile: w23234.dvf modified Wedday, 3 July 2002 at 09:04:22
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	1.521	1.518	1.509	1.356	1.269	0.9183
1962	3.699	3.691	3.656	3.592	3.445	2.459
1963	6.47	6.458	6.436	6.382	6.314	5.378
1964	6.754	6.745	6.723	6.695	6.666	6.212
1965	8.031	8.019	8.001	7.955	7.891	7.241
1966	8.661	8.648	8.616	8.288	8.173	7.801
1967	10.77	10.76	10.74	10.68	10.66	9.684
1968	10.58	10.56	10.53	10.47	10.39	9.722
1969	10.26	10.24	10.22	10.15	10.07	9.457
1970	10.66	10.65	10.61	10.53	10.45	9.625
1971	10.17	10.16	10.13	10.08	10.01	9.396
1972	9.479	9.467	9.442	9.403	9.336	8.85
1973	9.574	9.56	9.531	9.472	9.392	8.868
1974	10.9	10.88	10.84	10.76	10.67	9.74
1975	11.78	11.76	11.73	11.64	11.54	10.51
1976	11.02	11.01	10.97	10.91	10.83	10.16
1977	10.32	10.3	10.28	10.22	10.15	9.635
1978	11.49	11.48	11.41	11.26	11.14	10.28
1979	10.68	10.66	10.62	10.55	10.46	10.06
1980	11.45	11.43	11.4	11.33	11.25	10.52
1981	10.64	10.63	10.6	10.54	10.47	10.05

1982	13.58	13.56	13.49	13.4	13.28	12.06
1983	13.6	13.58	13.53	13.4	13.32	12.49
1984	12.54	12.52	12.48	12.38	12.28	11.64
1985	11.74	11.72	11.69	11.61	11.52	10.96
1986	11.19	11.18	11.15	11.08	11	10.41
1987	10.45	10.44	10.4	10.32	10.23	9.625
1988	11.31	11.29	11.24	11.13	11.02	10.05
1989	10.41	10.4	10.36	10.29	10.22	9.802
1990	10.96	10.94	10.86	10.69	10.56	9.942

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly		
0.032258064516129			13.6	13.58	13.53	13.4	13.32	12.49
0.0645161290322581			13.58	13.56	13.49	13.4	13.28	12.06
0.0967741935483871			12.54	12.52	12.48	12.38	12.28	11.64
0.129032258064516			11.78	11.76	11.73	11.64	11.54	10.96
0.161290322580645			11.74	11.72	11.69	11.61	11.52	10.52
0.193548387096774			11.49	11.48	11.41	11.33	11.25	10.51
0.225806451612903			11.45	11.43	11.4	11.26	11.14	10.41
0.258064516129032			11.31	11.29	11.24	11.13	11.02	10.28
0.290322580645161			11.19	11.18	11.15	11.08	11	10.16
0.32258064516129			11.02	11.01	10.97	10.91	10.83	10.06
0.354838709677419			10.96	10.94	10.86	10.76	10.67	10.05
0.387096774193548			10.9	10.88	10.84	10.69	10.66	10.05
0.419354838709677			10.77	10.76	10.74	10.68	10.56	9.942
0.451612903225806			10.68	10.66	10.62	10.55	10.47	9.802
0.483870967741936			10.66	10.65	10.61	10.54	10.46	9.74
0.516129032258065			10.64	10.63	10.6	10.53	10.45	9.722
0.548387096774194			10.58	10.56	10.53	10.47	10.39	9.684
0.580645161290323			10.45	10.44	10.4	10.32	10.23	9.635
0.612903225806452			10.41	10.4	10.36	10.29	10.22	9.625
0.645161290322581			10.32	10.3	10.28	10.22	10.15	9.625
0.67741935483871			10.26	10.24	10.22	10.15	10.07	9.457
0.709677419354839			10.17	10.16	10.13	10.08	10.01	9.396
0.741935483870968			9.574	9.56	9.531	9.472	9.392	8.868
0.774193548387097			9.479	9.467	9.442	9.403	9.336	8.85
0.806451612903226			8.661	8.648	8.616	8.288	8.173	7.801
0.838709677419355			8.031	8.019	8.001	7.955	7.891	7.241
0.870967741935484			6.754	6.745	6.723	6.695	6.666	6.212
0.903225806451613			6.47	6.458	6.436	6.382	6.314	5.378
0.935483870967742			3.699	3.691	3.656	3.592	3.445	2.459
0.967741935483871			1.521	1.518	1.509	1.356	1.269	0.9183
0.1	12.464	12.444	12.405	12.306	12.206	11.572		

Average of yearly averages: 9.11817666666667

Inputs generated by pe5.pl - Novemeber 2006

Data used for this run:
Output File: CAArtGRD
Metfile: w23234.dvf
PRZM scenario: CARowCropRLF.txt
EXAMS environment file: pond298.exv
Chemical Name: Myclobutanil

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	288.8	g/mol	
Henry's Law Const.	henry		atm-m^3/mol	
Vapor Pressure	vapr		torr	
Solubility	sol	142	mg/L	
Kd Kd	2.39	mg/L		
Koc Koc		mg/L		
Photolysis half-life	kdp		days	Half-life
Aerobic Aquatic Metabolism	kbacw	502	days	Halfife
Anaerobic Aquatic Metabolism	kbacs		days	Halfife
Aerobic Soil Metabolism	asm	251	days	Halfife
Hydrolysis: pH 7		days	Half-life	
Method: CAM 2	integer	See PRZM manual		
Incorporation Depth:	DEPI		cm	
Application Rate:	TAPP	0.112	kg/ha	
Application Efficiency:		APPEFF	0.99	fraction
Spray Drift	DRFT	0.01	fraction of application rate applied to pond	
Application Date	Date	1-3	dd/mm or dd/mmm or dd-mm or dd-mmm	
Interval 1	interval	14	days	Set to 0 or delete line for single app.
app. rate 1	apprate	0.112	kg/ha	
Interval 2	interval	14	days	Set to 0 or delete line for single app.
app. rate 2	apprate	0.112	kg/ha	

Interval 3	interval	14	days	Set to 0 or delete line for single app.
app. rate 3	apprate 0.112	kg/ha		
Interval 4	interval	14	days	Set to 0 or delete line for single app.
app. rate 4	apprate 0.112	kg/ha		
Interval 5	interval	14	days	Set to 0 or delete line for single app.
app. rate 5	apprate 0.112	kg/ha		
Record 17:	FILTRA			
IPSCND				
UPTKF				
Record 18:	PLVKRT			
PLDKRT				
FEXTRC	0.5			
Flag for Index Res. Run		IR	EPA Pond	
Flag for runoff calc.	RUNOFF	none	none, monthly or total(average of entire run)	

CA - Lettuce air

stored as CALetAir.out
Chemical: Myclobutanil
PRZM environment: CAlettuceSTD.txt modified Tueday, 21 February 2006 at 14:38:22
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 16:33:30
Metfile: w23273.dvf modified Wedday, 3 July 2002 at 09:04:22
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	24.77	24.7	24.42	16.51	12.17	4.537
1962	28.99	28.95	28.83	28.75	28.69	27.81
1963	42.22	42.17	42.01	41.91	41.83	39.36
1964	57.18	57.09	56.72	55.6	51.24	44.26
1965	65.68	65.61	65.26	61.18	58.33	55.82
1966	71.74	71.64	71.23	66.76	63.77	62.32
1967	71.82	71.73	71.38	71.01	70.94	69.06
1968	72.66	72.55	72.27	72.06	70.65	66.48
1969	74.29	74.19	73.95	73.53	73.2	71.03
1970	84.94	84.83	83.55	76.32	73.09	71.09
1971	84.32	84.21	83.75	82.82	82.34	80.41
1972	84.49	84.37	83.88	81.34	77.86	75.03
1973	82.55	82.45	82.15	81.6	81.47	79.06
1974	103	103	102	90.98	86.51	82.71
1975	104	103	103	103	102	98.12
1976	108	108	108	106	105	96.37
1977	105	105	105	104	103	99.82
1978	112	111	111	109	108	103
1979	106	106	106	105	105	101
1980	102	102	102	101	101	96.21
1981	101	101	101	100	99.85	95.53
1982	92.97	92.86	92.64	92.12	91.76	89.43
1983	87.64	87.55	87.18	86.62	86.64	84.08
1984	81.41	81.33	80.98	80.28	79.94	76.47
1985	79.17	79.07	78.67	76.79	76.5	73.93
1986	80.15	80.05	79.79	79.32	79.04	77.45
1987	81.26	81.18	80.83	80.44	80.08	78.33
1988	82.83	82.72	82.48	82.01	81.58	78.93
1989	80.74	80.66	80.33	79.68	79.33	75.45
1990	71.96	71.89	71.64	71.48	71.32	68.28

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	112	111	111	109	108	103
0.0645161290322581	108	108	108	106	105	101
0.0967741935483871	106	106	106	105	105	99.82
0.129032258064516	105	105	105	104	103	98.12
0.161290322580645	104	103	103	103	102	96.37
0.193548387096774	103	103	102	101	101	96.21
0.225806451612903	102	102	102	100	99.85	95.53
0.258064516129032	101	101	101	92.12	91.76	89.43
0.290322580645161	92.97	92.86	92.64	90.98	86.64	84.08
0.32258064516129	87.64	87.55	87.18	86.62	86.51	82.71
0.354838709677419	84.94	84.83	83.88	82.82	82.34	80.41
0.387096774193548	84.49	84.37	83.75	82.01	81.58	79.06
0.419354838709677	84.32	84.21	83.55	81.6	81.47	78.93
0.451612903225806	82.83	82.72	82.48	81.34	80.08	78.33
0.483870967741936	82.55	82.45	82.15	80.44	79.94	77.45
0.516129032258065	81.41	81.33	80.98	80.28	79.33	76.47

0.548387096774194	81.26	81.18	80.83	79.68	79.04	75.45
0.580645161290323	80.74	80.66	80.33	79.32	77.86	75.03
0.612903225806452	80.15	80.05	79.79	76.79	76.5	73.93
0.645161290322581	79.17	79.07	78.67	76.32	73.2	71.09
0.67741935483871	74.29	74.19	73.95	73.53	73.09	71.03
0.709677419354839	72.66	72.55	72,27	72.06	71.32	69.06
0.741935483870968	71.96	71.89	71.64	71.48	70.94	68.28
0.774193548387097	71.82	71.73	71.38	71.01	70.65	66.48
0.806451612903226	71.74	71.64	71.23	66.76	63.77	62.32
0.838709677419355	65.68	65.61	65.26	61.18	58.33	55.82
0.870967741935484	57.18	57.09	56.72	55.6	51.24	44.26
0.903225806451613	42.22	42.17	42.01	41.91	41.83	39.36
0.935483870967742	28.99	28.95	28.83	28.75	28.69	27.81
0.967741935483871	24.77	24.7	24.42	16.51	12.17	4.537

0.1 105.9 105.9 105.9 104.9 104.8 99.65

Average of yearly averages: 74.0459

Inputs generated by pe5.pl - Novemeber 2006

Data used for this run:
Output File: CALetAir
Metfile: w23273.dvf
PRZM scenario: CAlettuceSTD.txt
EXAMS environment file: pond298.exv
Chemical Name: Myclobutanil

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	288.8	g/mol	
Henry's Law Const.	henry		atm-m^3/mol	
Vapor Pressure vapr		torr		
Solubility	sol	142	mg/L	
Kd Kd	2.39	mg/L		
Koc Koc		mg/L		
Photolysis half-life	kdp		days	Half-life
Aerobic Aquatic Metabolism	kbacw	502	days	Halfife
Anaerobic Aquatic Metabolism	kbacs		days	Halfife
Aerobic Soil Metabolism	asm	251	days	Halfife
Hydrolysis: pH 7		days	Half-life	
Method: CAM 2	integer	See PRZM manual		
Incorporation Depth:	DEPI		cm	
Application Rate:	TAPP	0.14	kg/ha	
Application Efficiency:		APPEFF	0.95	fraction
Spray Drift	DRFT	0.05	fraction of application rate applied to pond	
Application Date	Date	20-2	dd/mm or dd/mmm or dd-mm or dd-mmm	
Interval 1	interval	14	days	Set to 0 or delete line for single app.
app. rate 1	apprate	0.14	kg/ha	
Interval 2	interval	14	days	Set to 0 or delete line for single app.
app. rate 2	apprate	0.14	kg/ha	
Interval 3	interval	14	days	Set to 0 or delete line for single app.
app. rate 3	apprate	0.14	kg/ha	
Interval 4	interval	14	days	Set to 0 or delete line for single app.
app. rate 4	apprate	0.14	kg/ha	
Interval 5	interval	14	days	Set to 0 or delete line for single app.
app. rate 5	apprate	0.14	kg/ha	
Interval 6	interval	14	days	Set to 0 or delete line for single app.
app. rate 6	apprate	0.14	kg/ha	
Interval 7	interval	14	days	Set to 0 or delete line for single app.
app. rate 7	apprate	0.14	kg/ha	
Interval 8	interval	14	days	Set to 0 or delete line for single app.
app. rate 8	apprate	0.14	kg/ha	
Interval 9	interval	14	days	Set to 0 or delete line for single app.
app. rate 9	apprate	0.14	kg/ha	
Interval 10	interval	14	days	Set to 0 or delete line for single app.
app. rate 10	apprate	0.14	kg/ha	
Interval 11	interval	14	days	Set to 0 or delete line for single app.
app. rate 11	apprate	0.14	kg/ha	
Record 17:	FILTRA			
IPSCND				
UPTKF				
Record 18:	PLVKRT			
PLDKRT				
FEXTRC	0.5			
Flag for Index Res. Run		IR	EPA Pond	
Flag for runoff calc.	RUNOFF	none	none, monthly or total(average of entire run)	

CA - Lettuce ground

stored as CALetgrd.out
Chemical: Myclobutanil
PRZM environment: CAlettuceSTD.txt modified Tueday, 21 February 2006 at 14:38:22
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 16:33:30
Metfile: w23273.dvf modified Wedday, 3 July 2002 at 09:04:22
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	22.98	22.91	22.63	14.37	9.816	2.732
1962	26.59	26.54	26.38	26.14	25.95	24.44
1963	37.64	37.6	37.52	37.3	37.05	34.41
1964	50.82	50.73	50.39	49.27	44.64	37.78
1965	58.5	58.42	58.11	53.84	50.78	48.42
1966	63.89	63.79	63.4	58.66	56.33	54.1
1967	64.23	64.14	63.83	63.22	62.99	60.22
1968	63.29	63.22	62.83	62.67	61.23	56.88
1969	64.76	64.67	64.36	63.68	63.43	61.07
1970	75.36	75.25	73.91	66.25	62.76	60.68
1971	74.77	74.67	74.24	73.35	72.75	69.86
1972	73.84	73.73	73.27	70.66	66.92	63.86
1973	71.94	71.86	71.77	71.28	71.04	67.79
1974	93.42	93.28	91.51	80.22	75.43	71.34
1975	93.43	93.31	92.85	92.6	92.42	87.17
1976	97.58	97.5	96.91	95.45	94.46	85.24
1977	94.4	94.32	93.92	92.84	91.97	88.84
1978	101	100	99.72	98.22	97.7	92.06
1979	95.99	95.91	95.73	95.31	95.05	89.94
1980	91.93	91.83	91.45	90.87	90.43	85.02
1981	90.34	90.28	90.04	89.5	89.22	84.31
1982	81.77	81.67	81.31	80.67	80.32	77.91
1983	76.63	76.54	76.22	75.73	75.65	72.46
1984	70.48	70.4	70.1	69.45	69	64.79
1985	68.06	67.97	67.6	65.93	65.53	62.21
1986	68.84	68.76	68.51	67.84	67.54	65.85
1987	70.16	70.09	69.68	69.05	68.71	66.6
1988	71.23	71.14	70.8	70.11	69.52	67.16
1989	69.58	69.5	69.21	68.6	68.14	63.43
1990	60.48	60.42	60.21	59.99	59.68	55.94

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly		
0.032258064516129			101	100	99.72	98.22	97.7	92.06
0.0645161290322581			97.58	97.5	96.91	95.45	95.05	89.94
0.0967741935483871			95.99	95.91	95.73	95.31	94.46	88.84
0.129032258064516			94.4	94.32	93.92	92.84	92.42	87.17
0.161290322580645			93.43	93.31	92.85	92.6	91.97	85.24
0.193548387096774			93.42	93.28	91.51	90.87	90.43	85.02
0.225806451612903			91.93	91.83	91.45	89.5	89.22	84.31
0.258064516129032			90.34	90.28	90.04	80.67	80.32	77.91
0.290322580645161			81.77	81.67	81.31	80.22	75.65	72.46
0.32258064516129			76.63	76.54	76.22	75.73	75.43	71.34
0.354838709677419			75.36	75.25	74.24	73.35	72.75	69.86
0.387096774193548			74.77	74.67	73.91	71.28	71.04	67.79
0.419354838709677			73.84	73.73	73.27	70.66	69.52	67.16
0.451612903225806			71.94	71.86	71.77	70.11	69	66.6
0.483870967741936			71.23	71.14	70.8	69.45	68.71	65.85
0.516129032258065			70.48	70.4	70.1	69.05	68.14	64.79
0.548387096774194			70.16	70.09	69.68	68.6	67.54	63.86
0.580645161290323			69.58	69.5	69.21	67.84	66.92	63.43
0.612903225806452			68.84	68.76	68.51	66.25	65.53	62.21
0.645161290322581			68.06	67.97	67.6	65.93	63.43	61.07
0.67741935483871			64.76	64.67	64.36	63.68	62.99	60.68
0.709677419354839			64.23	64.14	63.83	63.22	62.76	60.22
0.741935483870968			63.89	63.79	63.4	62.67	61.23	56.88
0.774193548387097			63.29	63.22	62.83	59.99	59.68	55.94
0.806451612903226			60.48	60.42	60.21	58.66	56.33	54.1
0.838709677419355			58.5	58.42	58.11	53.84	50.78	48.42
0.870967741935484			50.82	50.73	50.39	49.27	44.64	37.78
0.903225806451613			37.64	37.6	37.52	37.3	37.05	34.41
0.935483870967742			26.59	26.54	26.38	26.14	25.95	24.44
0.967741935483871			22.98	22.91	22.63	14.37	9.816	2.732
0.1	95.831	95.751	95.549	95.063	94.256	88.673		

Average of yearly averages: 64.0837333333333

Inputs generated by pe5.pl - Novemeber 2006

Data used for this run:
Output File: CALetgrd
Metfile: w23273.dvf
PRZM scenario: CAlettuceSTD.txt
EXAMS environment file: pond298.exv
Chemical Name: Myclobutanil

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	288.8	g/mol	
Henry's Law Const.	henry		atm-m^3/mol	
Vapor Pressure	vapr		torr	
Solubility	sol	142	mg/L	
Kd	Kd	2.39	mg/L	
Koc	Koc		mg/L	
Photolysis half-life	kdp		days	Half-life
Aerobic Aquatic Metabolism	kbacw	502	days	Halfife
Anaerobic Aquatic Metabolism	kbacs		days	Halfife
Aerobic Soil Metabolism	asm	251	days	Halfife
Hydrolysis:	pH 7		days	Half-life
Method: CAM	2	integer	See PRZM manual	
Incorporation Depth:	DEPI		cm	
Application Rate:	TAPP	0.14	kg/ha	
Application Efficiency:		APPEFF	0.99	fraction
Spray Drift	DRFT	0.01	fraction of application rate applied to pond	
Application Date	Date	20-2	dd/mm or dd/mmm or dd-mm or dd-mmm	
Interval 1	interval	14	days	Set to 0 or delete line for single app.
app. rate 1	apprate	0.14	kg/ha	
Interval 2	interval	14	days	Set to 0 or delete line for single app.
app. rate 2	apprate	0.14	kg/ha	
Interval 3	interval	14	days	Set to 0 or delete line for single app.
app. rate 3	apprate	0.14	kg/ha	
Interval 4	interval	14	days	Set to 0 or delete line for single app.
app. rate 4	apprate	0.14	kg/ha	
Interval 5	interval	14	days	Set to 0 or delete line for single app.
app. rate 5	apprate	0.14	kg/ha	
Interval 6	interval	14	days	Set to 0 or delete line for single app.
app. rate 6	apprate	0.14	kg/ha	
Interval 7	interval	14	days	Set to 0 or delete line for single app.
app. rate 7	apprate	0.14	kg/ha	
Interval 8	interval	14	days	Set to 0 or delete line for single app.
app. rate 8	apprate	0.14	kg/ha	
Interval 9	interval	14	days	Set to 0 or delete line for single app.
app. rate 9	apprate	0.14	kg/ha	
Interval 10	interval	14	days	Set to 0 or delete line for single app.
app. rate 10	apprate	0.14	kg/ha	
Interval 11	interval	14	days	Set to 0 or delete line for single app.
app. rate 11	apprate	0.14	kg/ha	
Record 17:	FILTRA			
IPSCND				
UPTKF				
Record 18:	PLVKRT			
PLDKRT				
FEXTRC	0.5			
Flag for Index Res. Run		IR	EPA Pond	
Flag for runoff calc.	RUNOFF	none	none, monthly or total(average of entire run)	

CA Okra air

stored as CAORKAIR.out
Chemical: Myclobutanil
PRZM environment: CAtomato_WirrigSTD.txt modified Tueday, 29 May 2007 at 12:43:54
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 16:33:30
Metfile: w23155.dvf modified Wedday, 3 July 2002 at 09:04:20
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	1.384	1.38	1.363	1.315	1.275	0.8266
1962	3.172	3.164	3.131	3.045	2.979	2.384
1963	4.711	4.699	4.65	4.536	4.463	3.782
1964	4.818	4.807	4.765	4.654	4.576	4.002
1965	5.037	5.025	4.975	4.857	4.782	4.185
1966	5.487	5.473	5.414	5.286	5.192	4.648

1967	6.27	6.254	6.189	6.058	5.954	5.196
1968	6.025	6.013	5.954	5.817	5.706	5.061
1969	5.98	5.964	5.894	5.756	5.652	4.967
1970	5.833	5.818	5.752	5.611	5.502	4.911
1971	6.49	6.475	6.4	6.302	6.21	5.499
1972	6.787	6.766	6.67	6.434	6.264	5.588
1973	6.444	6.425	6.346	6.193	6.077	5.417
1974	6.057	6.04	5.974	5.834	5.806	5.347
1975	6.941	6.924	6.85	6.698	6.574	5.857
1976	6.545	6.525	6.454	6.301	6.188	5.498
1977	6.032	6.018	5.966	5.838	5.726	5.215
1978	6.062	6.046	5.98	5.841	5.732	5.083
1979	5.732	5.715	5.648	5.507	5.398	4.76
1980	5.772	5.758	5.703	5.577	5.482	4.806
1981	5.612	5.6	5.541	5.406	5.294	4.703
1982	5.751	5.734	5.663	5.523	5.422	4.751
1983	5.662	5.647	5.589	5.464	5.375	4.981
1984	6.004	5.988	5.922	5.788	5.687	5.058
1985	5.766	5.753	5.701	5.589	5.495	4.937
1986	5.83	5.816	5.755	5.624	5.524	4.93
1987	6.344	6.327	6.259	6.123	6.018	5.53
1988	6.735	6.72	6.658	6.523	6.411	5.702
1989	6.228	6.215	6.177	6.049	5.948	5.313
1990	5.873	5.86	5.806	5.68	5.582	4.959

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly		
0.032258064516129			6.941	6.924	6.85	6.698	6.574	5.857
0.0645161290322581			6.787	6.766	6.67	6.523	6.411	5.702
0.0967741935483871			6.735	6.72	6.658	6.434	6.264	5.588
0.129032258064516			6.545	6.525	6.454	6.302	6.21	5.53
0.161290322580645			6.49	6.475	6.4	6.301	6.188	5.499
0.193548387096774			6.444	6.425	6.346	6.193	6.077	5.498
0.225806451612903			6.344	6.327	6.259	6.123	6.018	5.417
0.258064516129032			6.27	6.254	6.189	6.058	5.954	5.347
0.290322580645161			6.228	6.215	6.177	6.049	5.948	5.313
0.32258064516129			6.062	6.046	5.98	5.841	5.806	5.215
0.354838709677419			6.057	6.04	5.974	5.838	5.732	5.196
0.387096774193548			6.032	6.018	5.966	5.834	5.726	5.083
0.419354838709677			6.025	6.013	5.954	5.817	5.706	5.061
0.451612903225806			6.004	5.988	5.922	5.788	5.687	5.058
0.483870967741936			5.98	5.964	5.894	5.756	5.652	4.981
0.516129032258065			5.873	5.86	5.806	5.68	5.582	4.967
0.548387096774194			5.833	5.818	5.755	5.624	5.524	4.959
0.580645161290323			5.83	5.816	5.752	5.611	5.502	4.937
0.612903225806452			5.772	5.758	5.703	5.589	5.495	4.93
0.645161290322581			5.766	5.753	5.701	5.577	5.482	4.911
0.67741935483871			5.751	5.734	5.663	5.523	5.422	4.806
0.709677419354839			5.732	5.715	5.648	5.507	5.398	4.76
0.741935483870968			5.662	5.647	5.589	5.464	5.375	4.751
0.774193548387097			5.612	5.6	5.541	5.406	5.294	4.703
0.806451612903226			5.487	5.473	5.414	5.286	5.192	4.648
0.838709677419355			5.037	5.025	4.975	4.857	4.782	4.185
0.870967741935484			4.818	4.807	4.765	4.654	4.576	4.002
0.903225806451613			4.711	4.699	4.65	4.536	4.463	3.782
0.935483870967742			3.172	3.164	3.131	3.045	2.979	2.384
0.967741935483871			1.384	1.38	1.363	1.315	1.275	0.8266
0.1	6.716	6.7005	6.6376	6.4208	6.2586	5.5822		

Average of yearly averages: 4.79655333333333

Inputs generated by pe5.pl - Novemeber 2006

Data used for this run:
Output File: CAORKAIR
Metfile: w23155.dvf
PRZM scenario: CAtomato_WirrigSTD.txt
EXAMS environment file: pond298.exv
Chemical Name: Myclobutanil

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	288.8	g/mol	
Henry's Law Const.	henry		atm-m^3/mol	
Vapor Pressure	vapr		torr	
Solubility	sol	142	mg/L	
Kd Kd	2.39	mg/L		
Koc Koc		mg/L		

```
Photolysis half-life   kdp            days    Half-life
Aerobic Aquatic Metabolism    kbacw   502     days    Halfife
Anaerobic Aquatic Metabolism  kbacs           days    Halfife
Aerobic Soil Metabolism       asm     251     days    Halfife
Hydrolysis:    pH 7           days    Half-life
Method: CAM    2       integer See PRZM manual
Incorporation Depth:   DEPI           cm
Application Rate:      TAPP    0.14   kg/ha
Application Efficiency:        APPEFF  0.95    fraction
Spray Drift    DRFT    0.05    fraction of application rate applied to pond
Application Date       Date    1-4     dd/mm or dd/mmm or dd-mm or dd-mmm
Interval 1     interval        10      days    Set to 0 or delete line for single app.
app. rate 1    apprate 0.14    kg/ha
Interval 2     interval        10      days    Set to 0 or delete line for single app.
app. rate 2    apprate 0.14    kg/ha
Interval 3     interval        10      days    Set to 0 or delete line for single app.
app. rate 3    apprate 0.14    kg/ha
Record 17:     FILTRA
       IPSCND
       UPTKF
Record 18:     PLVKRT
       PLDKRT
       FEXTRC  0.5
Flag for Index Res. Run        IR      EPA Pond
Flag for runoff calc.  RUNOFF  none    none, monthly or total(average of entire run)
```

CA Okra ground

```
stored as CAORKGRD.out
Chemical: Myclobutanil
PRZM environment: CAtomato_WirrigSTD.txt     modified Tueday, 29 May 2007 at 12:43:54
EXAMS environment: pond298.exv       modified Thuday, 29 August 2002 at 16:33:30
Metfile: w23155.dvf    modified Wedday, 3 July 2002 at 09:04:20
Water segment concentrations (ppb)
```

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	0.3468	0.3462	0.344	0.2959	0.2798	0.1913
1962	1.4	1.397	1.386	1.357	1.334	1.105
1963	2.433	2.427	2.406	2.37	2.343	2.03
1964	2.111	2.107	2.095	2.062	2.035	1.871
1965	2.062	2.049	2.032	1.998	1.973	1.784
1966	2.398	2.395	2.382	2.238	2.21	2.075
1967	2.946	2.938	2.91	2.867	2.821	2.519
1968	2.677	2.674	2.653	2.614	2.581	2.351
1969	2.565	2.559	2.532	2.494	2.462	2.214
1970	2.886	2.88	2.86	2.452	2.325	2.179
1971	3.234	3.226	3.188	3.089	3.036	2.772
1972	3.579	3.57	3.519	3.39	3.296	2.826
1973	2.989	2.981	2.951	2.91	2.877	2.635
1974	3.447	3.442	3.424	3.325	3.284	2.583
1975	3.541	3.534	3.503	3.453	3.406	3.116
1976	3.149	3.14	3.108	3.029	2.985	2.73
1977	2.69	2.679	2.638	2.562	2.516	2.444
1978	2.67	2.664	2.64	2.602	2.567	2.351
1979	2.324	2.318	2.296	2.257	2.226	2.021
1980	2.389	2.383	2.363	2.317	2.276	2.046
1981	2.163	2.161	2.143	2.104	2.074	1.928
1982	2.332	2.326	2.301	2.263	2.233	1.993
1983	2.593	2.583	2.544	2.464	2.42	2.171
1984	2.5	2.494	2.471	2.431	2.402	2.211
1985	2.23	2.226	2.211	2.191	2.167	2.042
1986	2.239	2.234	2.214	2.177	2.149	1.982
1987	3.005	3.001	2.986	2.916	2.677	2.574
1988	3.137	3.13	3.107	3.062	3.016	2.755
1989	2.648	2.645	2.632	2.595	2.564	2.354
1990	2.233	2.229	2.214	2.179	2.152	1.969

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly	
0.032258064516129		3.579	3.57	3.519	3.453	3.406	3.116
0.0645161290322581		3.541	3.534	3.503	3.39	3.296	2.826
0.0967741935483871		3.447	3.442	3.424	3.325	3.284	2.772
0.129032258064516		3.234	3.226	3.188	3.089	3.036	2.755

0.161290322580645	3.149	3.14	3.108	3.062	3.016	2.73
0.193548387096774	3.137	3.13	3.107	3.029	2.985	2.635
0.225806451612903	3.005	3.001	2.986	2.916	2.877	2.583
0.258064516129032	2.989	2.981	2.951	2.91	2.821	2.574
0.290322580645161	2.946	2.938	2.91	2.867	2.677	2.519
0.32258064516129	2.886	2.88	2.86	2.614	2.581	2.444
0.354838709677419	2.69	2.679	2.653	2.602	2.567	2.354
0.387096774193548	2.677	2.674	2.64	2.595	2.564	2.351
0.419354838709677	2.67	2.664	2.638	2.562	2.516	2.351
0.451612903225806	2.648	2.645	2.632	2.494	2.462	2.214
0.483870967741936	2.593	2.583	2.544	2.464	2.42	2.211
0.516129032258065	2.565	2.559	2.532	2.452	2.402	2.179
0.548387096774194	2.5	2.494	2.471	2.431	2.343	2.171
0.580645161290323	2.433	2.427	2.406	2.37	2.325	2.075
0.612903225806452	2.398	2.395	2.382	2.317	2.276	2.046
0.645161290322581	2.389	2.383	2.363	2.263	2.233	2.042
0.67741935483871	2.332	2.326	2.301	2.257	2.226	2.03
0.709677419354839	2.324	2.318	2.296	2.238	2.21	2.021
0.741935483870968	2.239	2.234	2.214	2.191	2.167	1.993
0.774193548387097	2.233	2.229	2.214	2.179	2.152	1.982
0.806451612903226	2.23	2.226	2.211	2.177	2.149	1.969
0.838709677419355	2.163	2.161	2.143	2.104	2.074	1.928
0.870967741935484	2.111	2.107	2.095	2.062	2.035	1.871
0.903225806451613	2.062	2.049	2.032	1.998	1.973	1.784
0.935483870967742	1.4	1.397	1.386	1.357	1.334	1.105
0.967741935483871	0.3468	0.3462	0.344	0.2959	0.2798	0.1913

0.1	3.4257	3.4204	3.4004	3.3014	3.2592	2.7703

Average of yearly averages: 2.19407666666667

Inputs generated by pe5.pl ~ Novemeber 2006

Data used for this run:
Output File: CAORKGRD
Metfile: w23155.dvf
PRZM scenario: CAtomato_WirrigSTD.txt
EXAMS environment file: pond298.exv
Chemical Name: Myclobutanil

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	288.8	g/mol	
Henry's Law Const.	henry		atm-m^3/mol	
Vapor Pressure	vapr		torr	
Solubility	sol	142	mg/L	
Kd Kd	2.39	mg/L		
Koc Koc		mg/L		
Photolysis half-life	kdp		days	Half-life
Aerobic Aquatic Metabolism	kbacw	502	days	Halfife
Anaerobic Aquatic Metabolism	kbacs		days	Halfife
Aerobic Soil Metabolism	asm	251	days	Halfife
Hydrolysis: pH 7		days	Half-life	
Method: CAM 2	integer	See PRZM manual		
Incorporation Depth:	DEPI		cm	
Application Rate:	TAPP	0.14	kg/ha	
Application Efficiency:		APPEFF	0.99	fraction
Spray Drift	DRFT	0.01	fraction of application rate applied to pond	
Application Date	Date	1-4	dd/mm or dd/mmm or dd-mm or dd-mmm	
Interval 1	interval	10	days	Set to 0 or delete line for single app.
app. rate 1	apprate	0.14	kg/ha	
Interval 2	interval	10	days	Set to 0 or delete line for single app.
app. rate 2	apprate	0.14	kg/ha	
Interval 3	interval	10	days	Set to 0 or delete line for single app.
app. rate 3	apprate	0.14	kg/ha	
Record 17:	FILTRA			
IPSCND				
UPTKF				
Record 18:	PLVKRT			
PLDKRT				
FEXTRC	0.5			
Flag for Index Res. Run		IR	EPA Pond	
Flag for runoff calc.	RUNOFF	none	none, monthly or total(average of entire run)	

FL Okra air

stored as FLORKAIR.out

Chemical: Myclobutanil
PRZM environment: FLtomatoSTD.txt modified Tueday, 29 May 2007 at 12:54:10
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 16:33:30
Metfile: w12844.dvf modified Wedday, 3 July 2002 at 09:04:30
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	5.893	5.867	5.765	5.569	5.453	3.819
1962	9.52	9.488	9.422	9.231	9.044	7.094
1963	9.92	9.887	9.763	9.47	9.239	7.969
1964	10.57	10.54	10.44	10.3	10.27	8.975
1965	10.75	10.72	10.6	10.4	10.21	8.903
1966	18.36	18.3	18.07	17.75	17.51	14.1
1967	18.68	18.63	18.4	17.9	17.61	15.32
1968	15.92	15.89	15.83	15.65	15.44	13.54
1969	16.11	16.07	15.95	15.67	15.4	13.13
1970	23.47	23.43	23.13	22.74	22.29	17.86
1971	16.68	16.64	16.44	16.11	16.07	14.8
1972	14.99	14.95	14.87	14.69	14.41	12.64
1973	12.45	12.42	12.28	12.01	11.91	10.55
1974	13.96	13.92	13.73	13.46	13.21	10.99
1975	10.31	10.28	10.18	10.02	9.898	8.891
1976	13.91	13.86	13.67	13.32	13.1	10.79
1977	13.23	13.19	13.06	12.82	12.54	10.78
1978	11.27	11.25	11.19	10.97	10.83	9.493
1979	16.05	15.99	15.76	15.26	14.87	11.62
1980	15.49	15.45	15.29	14.99	14.77	12.61
1981	13.72	13.68	13.56	13.23	13.06	11.41
1982	17.61	17.56	17.4	17.13	16.79	13.69
1983	16.96	16.92	16.77	16.5	16.28	13.85
1984	19.06	19	18.89	18.55	18.19	15.52
1985	20.2	20.14	19.93	19.67	19.4	16.24
1986	18.66	18.62	18.49	18.26	17.95	15.37
1987	19.84	19.79	19.58	19.27	18.93	15.7
1988	16.73	16.69	16.62	16.33	16.13	14.01
1989	14.08	14.05	13.91	13.51	13.24	11.79
1990	12.32	12.28	12.14	11.96	11.79	10.15

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	23.47	23.43	23.13	22.74	22.29	17.86
0.0645161290322581	20.2	20.14	19.93	19.67	19.4	16.24
0.0967741935483871	19.84	19.79	19.58	19.27	18.93	15.7
0.129032258064516	19.06	19	18.89	18.55	18.19	15.52
0.161290322580645	18.68	18.63	18.49	18.26	17.95	15.37
0.193548387096774	18.66	18.62	18.4	17.9	17.61	15.32
0.225806451612903	18.36	18.3	18.07	17.75	17.51	14.8
0.258064516129032	17.61	17.56	17.4	17.13	16.79	14.1
0.290322580645161	16.96	16.92	16.77	16.5	16.28	14.01
0.32258064516129	16.73	16.69	16.62	16.33	16.13	13.85
0.354838709677419	16.68	16.64	16.44	16.11	16.07	13.69
0.387096774193548	16.11	16.07	15.95	15.67	15.44	13.54
0.419354838709677	16.05	15.99	15.83	15.65	15.4	13.13
0.451612903225806	15.92	15.89	15.76	15.26	14.87	12.64
0.483870967741936	15.49	15.45	15.29	14.99	14.77	12.61
0.516129032258065	14.99	14.95	14.87	14.69	14.41	11.79
0.548387096774194	14.08	14.05	13.91	13.51	13.24	11.62
0.580645161290323	13.96	13.92	13.73	13.46	13.21	11.41
0.612903225806452	13.91	13.86	13.67	13.32	13.1	10.99
0.645161290322581	13.72	13.68	13.56	13.23	13.06	10.79
0.67741935483871	13.23	13.19	13.06	12.82	12.54	10.78
0.709677419354839	12.45	12.42	12.28	12.01	11.91	10.55
0.741935483870968	12.32	12.28	12.14	11.96	11.79	10.15
0.774193548387097	11.27	11.25	11.19	10.97	10.83	9.493
0.806451612903226	10.75	10.72	10.6	10.4	10.27	8.975
0.838709677419355	10.57	10.54	10.44	10.3	10.21	8.903
0.870967741935484	10.31	10.28	10.18	10.02	9.898	8.891
0.903225806451613	9.92	9.887	9.763	9.47	9.239	7.969
0.935483870967742	9.52	9.488	9.422	9.231	9.044	7.094
0.967741935483871	5.893	5.867	5.765	5.569	5.453	3.819

0.1	19.762	19.711	19.511	19.198	18.856	15.682

Average of yearly averages: 12.0534666666667

Inputs generated by pe5.pl - Novemeber 2006

```
Data used for this run:
Output File: FLORKAIR
Metfile:        w12844.dvf
PRZM scenario: FLtomatoSTD.txt
EXAMS environment file:         pond298.exv
Chemical Name: Myclobutanil
Description     Variable Name   Value   Units   Comments
Molecular weight        mwt     288.8   g/mol
Henry's Law Const.      henry           atm-m^3/mol
Vapor Pressure vapr             torr
Solubility      sol     142     mg/L
Kd      Kd      2.39    mg/L
Koc     Koc             mg/L
Photolysis half-life    kdp             days    Half-life
Aerobic Aquatic Metabolism      kbacw   502     days    Halfife
Anaerobic Aquatic Metabolism    kbacs           days    Halfife
Aerobic Soil Metabolism         asm     251     days    Halfife
Hydrolysis:     pH 7            days    Half-life
Method: CAM     2       integer See PRZM manual
Incorporation Depth:    DEPI            cm
Application Rate:       TAPP    0.14    kg/ha
Application Efficiency:         APPEFF  0.95    fraction
Spray Drift     DRFT    0.05    fraction of application rate applied to pond
Application Date        Date    1-2     dd/mm or dd/mmm or dd-mm or dd-mmm
Interval 1      interval        10      days    Set to 0 or delete line for single app.
app. rate 1     apprate 0.14    kg/ha
Interval 2      interval        10      days    Set to 0 or delete line for single app.
app. rate 2     apprate 0.14    kg/ha
Interval 3      interval        10      days    Set to 0 or delete line for single app.
app. rate 3     apprate 0.14    kg/ha
Record 17:      FILTRA
        IPSCND
        UPTKF
Record 18:      PLVKRT
        PLDKRT
        FEXTRC  0.5
Flag for Index Res. Run         IR      EPA Pond
Flag for runoff calc.  RUNOFF   none    none, monthly or total(average of entire run)
```

FL Okra ground

```
stored as FLORKGRD.out
Chemical: Myclobutanil
PRZM environment: FLtomatoSTD.txt       modified Tueday, 29 May 2007 at 12:54:10
EXAMS environment: pond298.exv          modified Thuday, 29 August 2002 at 16:33:30
Metfile: w12844.dvf     modified Wedday, 3 July 2002 at 09:04:30
Water segment concentrations (ppb)
```

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	5.065	5.042	4.951	4.768	4.666	3.192
1962	8.176	8.147	8.091	7.94	7.782	6.013
1963	8.25	8.222	8.115	7.869	7.675	6.53
1964	8.598	8.575	8.476	8.393	8.275	7.318
1965	8.444	8.422	8.386	8.197	8.046	7.088
1966	16.27	16.22	16.01	15.72	15.51	12.37
1967	16.57	16.52	16.32	15.87	15.63	13.56
1968	13.56	13.53	13.46	13.35	13.17	11.62
1969	13.64	13.61	13.52	13.31	13.08	11.13
1970	21.36	21.32	21.03	20.65	20.24	16.06
1971	14.49	14.46	14.29	14.08	13.97	12.87
1972	12.68	12.65	12.56	12.42	12.19	10.68
1973	9.998	9.972	9.865	9.659	9.527	8.542
1974	11.54	11.5	11.35	11.14	10.94	9.013
1975	7.891	7.875	7.808	7.722	7.673	6.817
1976	11.41	11.37	11.21	10.91	10.74	8.753
1977	10.92	10.89	10.79	10.59	10.36	8.715
1978	8.607	8.59	8.542	8.388	8.308	7.357
1979	13.77	13.72	13.52	13.07	12.73	9.575
1980	12.98	12.94	12.83	12.58	12.4	10.6
1981	11.16	11.14	11.04	10.77	10.64	9.361
1982	15.34	15.29	15.09	14.89	14.6	11.77
1983	14.62	14.59	14.46	14.21	14.03	11.95
1984	16.83	16.78	16.69	16.41	16.09	13.67

1985	18.09	18.03	17.84	17.55	17.32	14.41
1986	16.42	16.39	16.23	16.05	15.78	13.51
1987	17.64	17.59	17.41	17.11	16.81	13.88
1988	14.43	14.39	14.31	14.08	13.9	12.12
1989	11.78	11.75	11.64	11.3	11.04	9.838
1990	9.823	9.797	9.73	9.555	9.421	8.162

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly	
0.032258064516129			21.36	21.32	21.03	20.65	20.24	16.06
0.0645161290322581			18.09	18.03	17.84	17.55	17.32	14.41
0.0967741935483871			17.64	17.59	17.41	17.11	16.81	13.88
0.129032258064516			16.83	16.78	16.69	16.41	16.09	13.67
0.161290322580645			16.57	16.52	16.32	16.05	15.78	13.56
0.193548387096774			16.42	16.39	16.23	15.87	15.63	13.51
0.225806451612903			16.27	16.22	16.01	15.72	15.51	12.87
0.258064516129032			15.34	15.29	15.09	14.89	14.6	12.37
0.290322580645161			14.62	14.59	14.46	14.21	14.03	12.12
0.32258064516129			14.49	14.46	14.31	14.08	13.97	11.95
0.354838709677419			14.43	14.39	14.29	14.08	13.9	11.77
0.387096774193548			13.77	13.72	13.52	13.35	13.17	11.62
0.419354838709677			13.64	13.61	13.52	13.31	13.08	11.13
0.451612903225806			13.56	13.53	13.46	13.07	12.73	10.68
0.483870967741936			12.98	12.94	12.83	12.58	12.4	10.6
0.516129032258065			12.68	12.65	12.56	12.42	12.19	9.838
0.548387096774194			11.78	11.75	11.64	11.3	11.04	9.575
0.580645161290323			11.54	11.5	11.35	11.14	10.94	9.361
0.612903225806452			11.41	11.37	11.21	10.91	10.74	9.013
0.645161290322581			11.16	11.14	11.04	10.77	10.64	8.753
0.67741935483871			10.92	10.89	10.79	10.59	10.36	8.715
0.709677419354839			9.998	9.972	9.865	9.659	9.527	8.542
0.741935483870968			9.823	9.797	9.73	9.555	9.421	8.162
0.774193548387097			8.607	8.59	8.542	8.393	8.308	7.357
0.806451612903226			8.598	8.575	8.476	8.388	8.275	7.318
0.838709677419355			8.444	8.422	8.386	8.197	8.046	7.088
0.870967741935484			8.25	8.222	8.115	7.94	7.782	6.817
0.903225806451613			8.176	8.147	8.091	7.869	7.675	6.53
0.935483870967742			7.891	7.875	7.808	7.722	7.673	6.013
0.967741935483871			5.065	5.042	4.951	4.768	4.666	3.192
0.1	17.559	17.509	17.338	17.04	16.738	13.859	

Average of yearly averages: 10.2158

Inputs generated by pe5.pl - Novemeber 2006

Data used for this run:
Output File: FLORKGRD
Metfile: w12844.dvf
PRZM scenario: FLtomatoSTD.txt
EXAMS environment file: pond298.exv
Chemical Name: Myclobutanil

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	288.8	g/mol	
Henry's Law Const.	henry		atm-m^3/mol	
Vapor Pressure	vapr		torr	
Solubility	sol	142	mg/L	
Kd Kd	2.39	mg/L		
Koc Koc		mg/L		
Photolysis half-life	kdp		days	Half-life
Aerobic Aquatic Metabolism	kbacw	502	days	Halfife
Anaerobic Aquatic Metabolism	kbacs		days	Halfife
Aerobic Soil Metabolism	asm	251	days	Halfife
Hydrolysis: pH 7			days	Half-life
Method: CAM 2	integer	See PRZM manual		
Incorporation Depth:	DEPI		cm	
Application Rate:	TAPP	0.14	kg/ha	
Application Efficiency:		APPEFF	0.99	fraction
Spray Drift	DRFT	0.01	fraction of application rate applied to pond	
Application Date	Date	1-2	dd/mm or dd/mmm or dd-mm or dd-mmm	
Interval 1	interval	10	days	Set to 0 or delete line for single app.
app. rate 1	apprate	0.14	kg/ha	
Interval 2	interval	10	days	Set to 0 or delete line for single app.
app. rate 2	apprate	0.14	kg/ha	
Interval 3	interval	10	days	Set to 0 or delete line for single app.
app. rate 3	apprate	0.14	kg/ha	

Record 17: FILTRA
IPSCND
UPTKF
Record 18: PLVKRT
PLDKRT
FEXTRC 0.5
Flag for Index Res. Run IR EPA Pond
Flag for runoff calc. RUNOFF none none, monthly or total(average of entire run)

PR Tropical Fruit air

stored as PRTFAIR.out
Chemical: Myclobutanil
PRZM environment: PRcoffeeSTD.txt modified Thuday, 23 February 2006 at 10:50:14
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 16:33:30
Metfile: w11641.dvf modified Wedday, 3 July 2002 at 09:06:16
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	11.67	11.62	11.54	11.19	11	7.609
1962	19.59	19.53	19.35	18.88	18.54	14.87
1963	30.46	30.35	30.03	29.31	28.78	23.27
1964	31.71	31.6	31.38	30.84	30.51	25.93
1965	40.42	40.35	39.82	38.59	37.74	30.49
1966	56.9	56.68	56.24	55.35	54.24	43.6
1967	45.32	45.23	44.63	43.71	43	39.21
1968	39.35	39.23	39.01	38.2	37.4	33.21
1969	52.05	51.86	51.37	50.39	49.32	41.26
1970	63.63	63.43	62.59	61.88	60.78	48.46
1971	53.98	53.8	53.01	51.27	50.05	45.35
1972	45.36	45.22	44.93	44.58	44.11	38.57
1973	64.43	64.18	63.5	61.86	60.7	49.03
1974	44.27	44.16	43.7	43.48	43.4	40.17
1975	37.19	37.06	36.72	36.21	35.72	32.55
1976	55.72	55.51	54.66	53.43	52.91	41.71
1977	58.92	58.7	57.89	56.1	54.8	45.56
1978	60.28	60.12	59.79	58.48	57.13	48.9
1979	58.47	58.26	57.49	55.55	54.2	46.81
1980	51.05	50.92	50.12	48.57	47.56	41.81
1981	50.61	50.43	50.13	48.85	47.77	40.94
1982	61.54	61.38	60.52	58.45	56.94	45.71
1983	81.78	81.44	80.1	78.95	77.25	60.22
1984	55.23	55.09	54.5	53.94	53.74	49.66
1985	57.27	57.06	56.27	54.46	53.16	45.28
1986	78.82	78.52	77.35	74.76	72.86	57.79
1987	113	113	111	108	105	84.7
1988	140	139	137	135	132	105
1989	101	101	99.91	98.43	98.11	89.47
1990	72.51	72.27	71.45	70.61	69.91	64.97

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly	
0.032258064516129	140	139	137	135	132	105	
0.0645161290322581	113	113	111	108	105	89.47	
0.0967741935483871	101	101	99.91	98.43	98.11	84.7	
0.129032258064516	81.78	81.44	80.1	78.95	77.25	64.97	
0.161290322580645	78.82	78.52	77.35	74.76	72.86	60.22	
0.193548387096774	72.51	72.27	71.45	70.61	69.91	57.79	
0.225806451612903	64.43	64.18	63.5	61.88	60.78	49.66	
0.258064516129032	63.63	63.43	62.59	61.86	60.7	49.03	
0.290322580645161	61.54	61.38	60.52	58.48	57.13	48.9	
0.32258064516129	60.28	60.12	59.79	58.45	56.94	48.46	
0.354838709677419	58.92	58.7	57.89	56.1	54.8	46.81	
0.387096774193548	58.47	58.26	57.49	55.55	54.24	45.71	
0.419354838709677	57.27	57.06	56.27	55.35	54.2	45.56	
0.451612903225806	56.9	56.68	56.24	54.46	53.74	45.35	
0.483870967741936	55.72	55.51	54.66	53.94	53.16	45.28	
0.516129032258065	55.23	55.09	54.5	53.43	52.91	43.6	
0.548387096774194	53.98	53.8	53.01	51.27	50.05	41.81	
0.580645161290323	52.05	51.86	51.37	50.39	49.32	41.71	
0.612903225806452	51.05	50.92	50.13	48.85	47.77	41.26	
0.645161290322581	50.61	50.43	50.12	48.57	47.56	40.94	
0.67741935483871	45.36	45.23	44.93	44.58	44.11	40.17	
0.709677419354839	45.32	45.22	44.63	43.71	43.4	39.21	
0.741935483870968	44.27	44.16	43.7	43.48	43	38.57	

0.774193548387097	40.42	40.35	39.82	38.59	37.74	33.21
0.806451612903226	39.35	39.23	39.01	38.2	37.4	32.55
0.838709677419355	37.19	37.06	36.72	36.21	35.72	30.49
0.870967741935484	31.71	31.6	31.38	30.84	30.51	25.93
0.903225806451613	30.46	30.35	30.03	29.31	28.78	23.27
0.935483870967742	19.59	19.53	19.35	18.88	18.54	14.87
0.967741935483871	11.67	11.62	11.54	11.19	11	7.609

0.1	99.078	99.044	97.929	96.482	96.024	82.727

Average of yearly averages: 46.0703

Inputs generated by pe5.pl - Novemeber 2006

Data used for this run:
Output File: PRTFAIR
Metfile: w11641.dvf
PRZM scenario: PRcoffeeSTD.txt
EXAMS environment file: pond298.exv
Chemical Name: Myclobutanil

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	288.8	g/mol	
Henry's Law Const.	henry		atm-m^3/mol	
Vapor Pressure vapr		torr		
Solubility	sol	142	mg/L	
Kd Kd	2.39	mg/L		
Koc Koc		mg/L		
Photolysis half-life	kdp		days	Half-life
Aerobic Aquatic Metabolism	kbacw	502	days	Halfife
Anaerobic Aquatic Metabolism	kbacs		days	Halfife
Aerobic Soil Metabolism	asm	251	days	Halfife
Hydrolysis: pH 7		days	Half-life	
Method: CAM 2	integer	See PRZM manual		
Incorporation Depth:	DEPI		cm	
Application Rate:	TAPP	0.28	kg/ha	
Application Efficiency:		APPEFF	0.95	fraction
Spray Drift	DRFT	0.05	fraction of application rate applied to pond	
Application Date	Date	1-2	dd/mm or dd/mmm or dd-mm or dd-mmm	
Interval 1	interval	14	days	Set to 0 or delete line for single app.
app. rate 1	apprate	0.28	kg/ha	
Interval 2	interval	14	days	Set to 0 or delete line for single app.
app. rate 2	apprate	0.28	kg/ha	
Interval 3	interval	14	days	Set to 0 or delete line for single app.
app. rate 3	apprate	0.28	kg/ha	
Interval 4	interval	14	days	Set to 0 or delete line for single app.
app. rate 4	apprate	0.28	kg/ha	
Interval 5	interval	14	days	Set to 0 or delete line for single app.
app. rate 5	apprate	0.28	kg/ha	
Interval 6	interval	14	days	Set to 0 or delete line for single app.
app. rate 6	apprate	0.28	kg/ha	
Interval 7	interval	14	days	Set to 0 or delete line for single app.
app. rate 7	apprate	0.28	kg/ha	
Record 17:	FILTRA			
IPSCND				
UPTKF				
Record 18:	PLVKRT			
PLDKRT				
FEXTRC	0.5			
Flag for Index Res. Run	IR	EPA Pond		
Flag for runoff calc.	RUNOFF	none	none, monthly or total(average of entire run)	

PR Tropical Fruit ground

stored as PRTFGRD.out
Chemical: Myclobutanil
PRZM environment: PRcoffeeSTD.txt modified Thuday, 23 February 2006 at 10:50:14
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 16:33:30
Metfile: w11641.dvf modified Wedday, 3 July 2002 at 09:06:16
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	8.186	8.152	8.078	7.848	7.652	5.099
1962	13.8	13.77	13.65	13.28	13.04	10.34

1963	23.69	23.61	23.29	22.71	22.27	17.69
1964	24.25	24.16	23.95	23.67	23.27	19.7
1965	32.63	32.57	32.12	31.11	30.36	23.93
1966	49.81	49.62	49.13	48.18	47.16	37.32
1967	37.26	37.17	36.69	35.86	35.27	32.55
1968	30.96	30.86	30.66	30.02	29.42	26.16
1969	44.14	43.98	43.54	42.64	41.76	34.46
1970	56.31	56.12	55.37	54.56	53.62	41.95
1971	46.15	45.99	45.32	43.83	42.78	38.79
1972	38.1	37.98	37.64	37.02	36.43	31.83
1973	57.57	57.37	56.49	54.77	53.75	42.83
1974	39.2	39.1	38.69	37.85	37.6	33.63
1975	29.16	29.05	28.79	28.56	28.27	25.67
1976	48	47.81	47.07	45.96	45.54	35.15
1977	51.52	51.32	50.56	49	47.86	39.12
1978	52.89	52.72	52.29	51.25	50.07	42.59
1979	50.81	50.62	49.96	48.28	47.04	40.45
1980	43.4	43.29	42.6	41.25	40.21	35.34
1981	42.92	42.82	42.54	41.47	40.53	34.61
1982	54.22	54.05	53.3	51.45	50.09	39.52
1983	75.34	75.02	73.78	72.77	71.18	54.68
1984	50.8	50.67	50.13	49.28	48.67	43.64
1985	49.68	49.5	48.8	47.2	46.08	38.89
1986	71.91	71.63	70.55	68.17	66.4	51.78
1987	108	107	106	103	100	79.83
1988	136	135	133	130	128	101
1989	97.29	97.04	96.16	94.06	93.3	84.83
1990	68.02	67.85	67.15	65.76	65.11	59.29

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129			136	135	133	130	128	101
0.0645161290322581			108	107	106	103	100	84.83
0.0967741935483871			97.29	97.04	96.16	94.06	93.3	79.83
0.129032258064516			75.34	75.02	73.78	72.77	71.18	59.29
0.161290322580645			71.91	71.63	70.55	68.17	66.4	54.68
0.193548387096774			68.02	67.85	67.15	65.76	65.11	51.78
0.225806451612903			57.57	57.37	56.49	54.77	53.75	43.64
0.258064516129032			56.31	56.12	55.37	54.56	53.62	42.83
0.290322580645161			54.22	54.05	53.3	51.45	50.09	42.59
0.32258064516129			52.89	52.72	52.29	51.25	50.07	41.95
0.354838709677419			51.52	51.32	50.56	49.28	48.67	40.45
0.387096774193548			50.81	50.67	50.13	49	47.86	39.52
0.419354838709677			50.8	50.62	49.96	48.28	47.16	39.12
0.451612903225806			49.81	49.62	49.13	48.18	47.04	38.89
0.483870967741936			49.68	49.5	48.8	47.2	46.08	38.79
0.516129032258065			48	47.81	47.07	45.96	45.54	37.32
0.548387096774194			46.15	45.99	45.32	43.83	42.78	35.34
0.580645161290323			44.14	43.98	43.54	42.64	41.76	35.15
0.612903225806452			43.4	43.29	42.6	41.47	40.53	34.61
0.645161290322581			42.92	42.82	42.54	41.25	40.21	34.46
0.67741935483871			39.2	39.1	38.69	37.85	37.6	33.63
0.709677419354839			38.1	37.98	37.64	37.02	36.43	32.55
0.741935483870968			37.26	37.17	36.69	35.86	35.27	31.83
0.774193548387097			32.63	32.57	32.12	31.11	30.36	26.16
0.806451612903226			30.96	30.86	30.66	30.02	29.42	25.67
0.838709677419355			29.16	29.05	28.79	28.56	28.27	23.93
0.870967741935484			24.25	24.16	23.95	23.67	23.27	19.7
0.903225806451613			23.69	23.61	23.29	22.71	22.27	17.69
0.935483870967742			13.8	13.77	13.65	13.28	13.04	10.34
0.967741935483871			8.186	8.152	8.078	7.848	7.652	5.099
0.1	95.095	94.838	93.922	91.931	91.088	77.776		

Average of yearly averages: 40.0889666666667

Inputs generated by pe5.pl - Novemeber 2006

Data used for this run:
Output File: PRTFGRD
Metfile: w11641.dvf
PRZM scenario: PRcoffeeSTD.txt
EXAMS environment file: pond298.exv
Chemical Name: Myclobutanil

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	288.8	g/mol	
Henry's Law Const.	henry		atm-m^3/mol	

```
Vapor Pressure vapr              torr
Solubility     sol     142       mg/L
Kd      Kd      2.39    mg/L
Koc     Koc             mg/L
Photolysis half-life    kdp              days    Half-life
Aerobic Aquatic Metabolism      kbacw    502     days    Halfife
Anaerobic Aquatic Metabolism    kbacs            days    Halfife
Aerobic Soil Metabolism         asm      251     days    Halfife
Hydrolysis:     pH 7            days     Half-life
Method: CAM     2       integer See PRZM manual
Incorporation Depth:    DEPI             cm
Application Rate:       TAPP     0.28    kg/ha
Application Efficiency:          APPEFF   0.99    fraction
Spray Drift     DRFT    0.01     fraction of application rate applied to pond
Application Date        Date     1-2     dd/mm or dd/mmm or dd-mm or dd-mmm
Interval 1      interval         14      days    Set to 0 or delete line for single app.
app. rate 1     apprate 0.28     kg/ha
Interval 2      interval         14      days    Set to 0 or delete line for single app.
app. rate 2     apprate 0.28     kg/ha
Interval 3      interval         14      days    Set to 0 or delete line for single app.
app. rate 3     apprate 0.28     kg/ha
Interval 4      interval         14      days    Set to 0 or delete line for single app.
app. rate 4     apprate 0.28     kg/ha
Interval 5      interval         14      days    Set to 0 or delete line for single app.
app. rate 5     apprate 0.28     kg/ha
Interval 6      interval         14      days    Set to 0 or delete line for single app.
app. rate 6     apprate 0.28     kg/ha
Interval 7      interval         14      days    Set to 0 or delete line for single app.
app. rate 7     apprate 0.28     kg/ha
Record 17:      FILTRA
        IPSCND
        UPTKF
Record 18:      PLVKRT
        PLDKRT
        FEXTRC  0.5
Flag for Index Res. Run         IR       EPA Pond
Flag for runoff calc.  RUNOFF   none     none, monthly or total(average of entire run)
```

FL Tropical Fruit air

```
stored as FLTFAIR.out
Chemical: Myclobutanil
PRZM environment: FLavocadoSTD.txt    modified Tueday, 29 May 2007 at 12:44:32
EXAMS environment: pond298.exv        modified Thuday, 29 August 2002 at 16:33:30
Metfile: w12839.dvf    modified Wedday, 3 July 2002 at 09:04:28
Water segment concentrations (ppb)
```

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	5.978	5.957	5.849	5.616	5.455	3.537
1962	8.962	8.929	8.794	8.557	8.391	6.784
1963	12.11	12.06	11.88	11.6	11.41	9.381
1964	13.07	13.02	12.82	12.5	12.28	10.61
1965	13.18	13.13	12.98	12.68	12.5	10.99
1966	15.86	15.81	15.6	15.11	14.74	12.42
1967	16.62	16.57	16.36	15.82	15.47	13.58
1968	17.53	17.47	17.23	16.8	16.52	14.35
1969	16.16	16.1	15.89	15.61	15.41	13.79
1970	16.99	16.93	16.67	16.32	15.95	13.78
1971	15.82	15.77	15.6	15.27	15.05	13.42
1972	15.89	15.86	15.65	15.29	15.04	13.19
1973	15.05	15	14.79	14.5	14.31	12.78
1974	14.65	14.6	14.38	14.03	13.82	12.21
1975	14	13.95	13.75	13.46	13.28	11.76
1976	13.94	13.89	13.7	13.4	13.19	11.63
1977	19.98	19.9	19.6	19.08	18.78	14.95
1978	17.45	17.39	17.13	16.88	16.68	15.01
1979	30.96	30.83	30.5	30.18	29.66	22.26
1980	24.32	24.24	23.98	23.77	23.6	21.52
1981	20.43	20.35	20.08	19.85	19.66	17.89
1982	19.59	19.52	19.24	19.01	18.8	16.41
1983	17.48	17.42	17.21	16.87	16.66	14.97
1984	17.18	17.12	16.93	16.6	16.3	14.44
1985	16.27	16.22	15.98	15.68	15.48	13.86
1986	15.96	15.9	15.67	15.39	15.18	13.38

1987	15.07	15.02	14.78	14.62	14.44	12.83
1988	15.22	15.17	14.95	14.54	14.31	12.62
1989	14.33	14.28	14.07	13.79	13.6	12.06
1990	14.34	14.29	14.08	13.78	13.57	11.88

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly		
0.032258064516129			30.96	30.83	30.5	30.18	29.66	22.26
0.0645161290322581			24.32	24.24	23.98	23.77	23.6	21.52
0.0967741935483871			20.43	20.35	20.08	19.85	19.66	17.89
0.129032258064516			19.98	19.9	19.6	19.08	18.8	16.41
0.161290322580645			19.59	19.52	19.24	19.01	18.78	15.01
0.193548387096774			17.53	17.47	17.23	16.88	16.68	14.97
0.225806451612903			17.48	17.42	17.21	16.87	16.66	14.95
0.258064516129032			17.45	17.39	17.13	16.8	16.52	14.44
0.290322580645161			17.18	17.12	16.93	16.6	16.3	14.35
0.32258064516129			16.99	16.93	16.67	16.32	15.95	13.86
0.354838709677419			16.62	16.57	16.36	15.82	15.48	13.79
0.387096774193548			16.27	16.22	15.98	15.68	15.47	13.78
0.419354838709677			16.16	16.1	15.89	15.61	15.41	13.58
0.451612903225806			15.96	15.9	15.67	15.39	15.18	13.42
0.483870967741936			15.89	15.86	15.65	15.29	15.05	13.38
0.516129032258065			15.86	15.81	15.6	15.27	15.04	13.19
0.548387096774194			15.82	15.77	15.6	15.11	14.74	12.83
0.580645161290323			15.22	15.17	14.95	14.62	14.44	12.78
0.612903225806452			15.07	15.02	14.79	14.54	14.31	12.62
0.645161290322581			15.05	15	14.78	14.5	14.31	12.42
0.67741935483871			14.65	14.6	14.38	14.03	13.82	12.21
0.709677419354839			14.34	14.29	14.08	13.79	13.6	12.06
0.741935483870968			14.33	14.28	14.07	13.78	13.57	11.88
0.774193548387097			14	13.95	13.75	13.46	13.28	11.76
0.806451612903226			13.94	13.89	13.7	13.4	13.19	11.63
0.838709677419355			13.18	13.13	12.98	12.68	12.5	10.99
0.870967741935484			13.07	13.02	12.82	12.5	12.28	10.61
0.903225806451613			12.11	12.06	11.88	11.6	11.41	9.381
0.935483870967742			8.962	8.929	8.794	8.557	8.391	6.784
0.967741935483871			5.978	5.957	5.849	5.616	5.455	3.537
0.1	20.385	20.305	20.032	19.773	19.574	17.742		

Average of yearly averages: 13.2764

Inputs generated by pe5.pl - Novemeber 2006

Data used for this run:
Output File: FLTFAIR
Metfile: w12839.dvf
PRZM scenario: FLavocadoSTD.txt
EXAMS environment file: pond298.exv
Chemical Name: Myclobutanil

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	288.8	g/mol	
Henry's Law Const.	henry		atm-m^3/mol	
Vapor Pressure	vapr		torr	
Solubility	sol	142	mg/L	
Kd	Kd	2.39	mg/L	
Koc	Koc		mg/L	
Photolysis half-life	kdp		days	Half-life
Aerobic Aquatic Metabolism	kbacw	502	days	Halfife
Anaerobic Aquatic Metabolism	kbacs		days	Halfife
Aerobic Soil Metabolism	asm	251	days	Halfife
Hydrolysis:	pH 7		days	Half-life
Method: CAM	2	integer	See PRZM manual	
Incorporation Depth:	DEPI		cm	
Application Rate:	TAPP	0.28	kg/ha	
Application Efficiency:		APPEFF	0.95	fraction
Spray Drift	DRFT	0.05	fraction of application rate applied to pond	
Application Date	Date	1-3	dd/mm or dd/mmm or dd-mm or dd-mmm	
Interval 1	interval	14	days	Set to 0 or delete line for single app.
app. rate 1	apprate	0.28	kg/ha	
Interval 2	interval	14	days	Set to 0 or delete line for single app.
app. rate 2	apprate	0.28	kg/ha	
Interval 3	interval	14	days	Set to 0 or delete line for single app.
app. rate 3	apprate	0.28	kg/ha	
Interval 4	interval	14	days	Set to 0 or delete line for single app.
app. rate 4	apprate	0.28	kg/ha	
Interval 5	interval	14	days	Set to 0 or delete line for single app.

```
app. rate 5     apprate 0.28    kg/ha
Interval 6      interval        14      days    Set to 0 or delete line for single app.
app. rate 6     apprate 0.28    kg/ha
Interval 7      interval        14      days    Set to 0 or delete line for single app.
app. rate 7     apprate 0.28    kg/ha
Record 17:      FILTRA
        IPSCND
        UPTKF
Record 18:      PLVKRT
        PLDKRT
        FEXTRC  0.5
Flag for Index Res. Run         IR      EPA Pond
Flag for runoff calc.  RUNOFF   none    none, monthly or total(average of entire run)
```

FL Tropical Fruit ground

stored as FLTFGRD.out
Chemical: Myclobutanil
PRZM environment: FLavocadoSTD.txt modified Tueday, 29 May 2007 at 12:44:32
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 16:33:30
Metfile: w12839.dvf modified Wedday, 3 July 2002 at 09:04:28
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	2.013	2.003	1.966	1.883	1.825	1.096
1962	2.605	2.595	2.556	2.465	2.401	1.972
1963	4.047	4.031	3.979	3.935	3.874	3.009
1964	3.987	3.973	3.914	3.801	3.738	3.279
1965	3.576	3.564	3.516	3.436	3.391	3.069
1966	5.752	5.73	5.637	5.442	5.301	3.992
1967	6.298	6.274	6.187	5.973	5.822	4.876
1968	6.895	6.872	6.772	6.551	6.425	5.464
1969	5.36	5.342	5.296	5.265	5.235	4.821
1970	6.268	6.243	6.189	6.03	5.879	4.829
1971	5.212	5.198	5.128	5.001	4.935	4.521
1972	5.345	5.328	5.256	5.085	4.989	4.327
1973	4.361	4.347	4.291	4.248	4.212	3.863
1974	4.036	4.021	3.963	3.848	3.769	3.386
1975	3.477	3.465	3.419	3.368	3.33	3.012
1976	3.338	3.326	3.28	3.208	3.149	2.806
1977	9.462	9.419	9.329	8.981	8.829	6.15
1978	6.791	6.77	6.732	6.717	6.699	6.171
1979	21.96	21.87	21.5	20.77	20.22	13.77
1980	14.79	14.77	14.66	14.43	14.32	13
1981	10.56	10.55	10.5	10.35	10.29	9.219
1982	9.381	9.35	9.271	9.172	9.015	7.784
1983	6.974	6.951	6.858	6.764	6.739	6.259
1984	6.706	6.682	6.587	6.399	6.296	5.575
1985	5.479	5.46	5.413	5.325	5.273	4.871
1986	5.069	5.052	5.003	4.938	4.897	4.349
1987	4.738	4.72	4.642	4.475	4.357	3.938
1988	4.568	4.551	4.496	4.346	4.237	3.778
1989	3.8	3.787	3.736	3.693	3.656	3.322
1990	3.871	3.856	3.805	3.742	3.669	3.205

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly		
0.032258064516129		21.96	21.87	21.5	20.77	20.22	13.77	
0.0645161290322581		14.79	14.77	14.66	14.43	14.32	13	
0.0967741935483871		10.56	10.55	10.5	10.35	10.29	9.219	
0.129032258064516		9.462	9.419	9.329	9.172	9.015	7.784	
0.161290322580645		9.381	9.35	9.271	8.981	8.829	6.259	
0.193548387096774		6.974	6.951	6.858	6.764	6.739	6.171	
0.225806451612903		6.895	6.872	6.772	6.717	6.699	6.15	
0.258064516129032		6.791	6.77	6.732	6.551	6.425	5.575	
0.290322580645161		6.706	6.682	6.587	6.399	6.296	5.464	
0.32258064516129		6.298	6.274	6.189	6.03	5.879	4.876	
0.354838709677419		6.268	6.243	6.187	5.973	5.822	4.871	
0.387096774193548		5.752	5.73	5.637	5.442	5.301	4.829	
0.419354838709677		5.479	5.46	5.413	5.325	5.273	4.821	
0.451612903225806		5.36	5.342	5.296	5.265	5.235	4.521	
0.483870967741936		5.345	5.328	5.256	5.085	4.989	4.349	
0.516129032258065		5.212	5.198	5.128	5.001	4.935	4.327	
0.548387096774194		5.069	5.052	5.003	4.938	4.897	3.992	

0.580645161290323	4.738	4.72	4.642	4.475	4.357	3.938
0.612903225806452	4.568	4.551	4.496	4.346	4.237	3.863
0.645161290322581	4.361	4.347	4.291	4.248	4.212	3.778
0.67741935483871	4.047	4.031	3.979	3.935	3.874	3.386
0.709677419354839	4.036	4.021	3.963	3.848	3.769	3.322
0.741935483870968	3.987	3.973	3.914	3.801	3.738	3.279
0.774193548387097	3.871	3.856	3.805	3.742	3.669	3.205
0.806451612903226	3.8	3.787	3.736	3.693	3.656	3.069
0.838709677419355	3.576	3.564	3.516	3.436	3.391	3.012
0.870967741935484	3.477	3.465	3.419	3.368	3.33	3.009
0.903225806451613	3.338	3.326	3.28	3.208	3.149	2.806
0.935483870967742	2.605	2.595	2.556	2.465	2.401	1.972
0.967741935483871	2.013	2.003	1.966	1.883	1.825	1.096

0.1 10.4502 10.4369 10.3829 10.2322 10.1625 9.0755

Average of yearly averages: 4.99043333333333

Inputs generated by pe5.pl - Novemeber 2006

Data used for this run:
Output File: FLTFGRD
Metfile: w12839.dvf
PRZM scenario: FLavocadoSTD.txt
EXAMS environment file: pond298.exv
Chemical Name: Myclobutanil

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	288.8	g/mol	
Henry's Law Const.	henry		atm-m^3/mol	
Vapor Pressure	vapr		torr	
Solubility	sol	142	mg/L	
Kd Kd	2.39	mg/L		
Koc Koc		mg/L		
Photolysis half-life	kdp		days	Half-life
Aerobic Aquatic Metabolism	kbacw	502	days	Halfife
Anaerobic Aquatic Metabolism	kbacs		days	Halfife
Aerobic Soil Metabolism	asm	251	days	Halfife
Hydrolysis: pH 7		days	Half-life	
Method: CAM 2	integer	See PRZM manual		
Incorporation Depth:	DEPI		cm	
Application Rate:	TAPP	0.28	kg/ha	
Application Efficiency:		APPEFF	0.99	fraction
Spray Drift	DRFT	0.01	fraction of application rate applied to pond	
Application Date	Date	1-3	dd/mm or dd/mmm or dd-mm or dd-mmm	
Interval 1	interval	14	days	Set to 0 or delete line for single app.
app. rate 1	apprate	0.28	kg/ha	
Interval 2	interval	14	days	Set to 0 or delete line for single app.
app. rate 2	apprate	0.28	kg/ha	
Interval 3	interval	14	days	Set to 0 or delete line for single app.
app. rate 3	apprate	0.28	kg/ha	
Interval 4	interval	14	days	Set to 0 or delete line for single app.
app. rate 4	apprate	0.28	kg/ha	
Interval 5	interval	14	days	Set to 0 or delete line for single app.
app. rate 5	apprate	0.28	kg/ha	
Interval 6	interval	14	days	Set to 0 or delete line for single app.
app. rate 6	apprate	0.28	kg/ha	
Interval 7	interval	14	days	Set to 0 or delete line for single app.
app. rate 7	apprate	0.28	kg/ha	
Record 17:	FILTRA			
IPSCND				
UPTKF				
Record 18:	PLVKRT			
PLDKRT				
FEXTRC	0.5			
Flag for Index Res. Run	IR	EPA Pond		
Flag for runoff calc.	RUNOFF	none	none, monthly or total(average of entire run)	

LA Tropical Fruit air

stored as LATFAIR.out
Chemical: Myclobutanil
PRZM environment: LAsugarcaneSTD.txt modified Tueday, 29 May 2007 at 12:56:00
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 16:33:30
Metfile: w13970.dvf modified Wedday, 3 July 2002 at 09:05:36
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	40.43	40.31	39.8	38.81	38.27	26.39
1962	97.65	97.4	96.53	93.91	91.51	68.63
1963	79.45	79.19	78.7	77.36	76.07	72.98
1964	102	102	101	98.7	97.43	86.44
1965	103	102	101	101	99.42	91.83
1966	114	114	112	110	110	98.29
1967	184	183	181	180	179	145
1968	150	150	149	148	148	139
1969	164	164	162	158	155	142
1970	163	163	162	161	159	145
1971	148	147	146	144	144	134
1972	169	169	167	164	162	139
1973	177	177	175	173	171	150
1974	153	152	151	151	150	139
1975	168	167	166	164	163	144
1976	168	167	166	164	162	145
1977	169	168	167	163	161	146
1978	159	159	158	156	155	141
1979	177	176	174	173	171	153
1980	221	220	217	210	209	182
1981	191	190	188	185	184	172
1982	162	162	160	159	158	148
1983	183	182	181	178	175	155
1984	155	155	154	152	151	142
1985	139	138	137	134	133	125
1986	147	147	146	143	140	123
1987	138	138	137	136	135	123
1988	134	134	132	130	129	119
1989	158	157	157	154	151	130
1990	143	143	142	141	139	130

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129			221	220	217	210	209	182
0.0645161290322581			191	190	188	185	184	172
0.0967741935483871			184	183	181	180	179	155
0.129032258064516			183	182	181	178	175	153
0.161290322580645			177	177	175	173	171	150
0.193548387096774			177	176	174	173	171	148
0.225806451612903			169	169	167	164	163	146
0.258064516129032			169	168	167	164	162	145
0.290322580645161			168	167	166	164	162	145
0.32258064516129			168	167	166	163	161	145
0.354838709677419			164	164	162	161	159	144
0.387096774193548			163	163	162	159	158	142
0.419354838709677			162	162	160	158	155	142
0.451612903225806			159	159	158	156	155	141
0.483870967741936			158	157	157	154	151	139
0.516129032258065			155	155	154	152	151	139
0.548387096774194			153	152	151	151	150	139
0.580645161290323			150	150	149	148	148	134
0.612903225806452			148	147	146	144	144	130
0.645161290322581			147	147	146	143	140	130
0.67741935483871			143	143	142	141	139	125
0.709677419354839			139	138	137	136	135	123
0.741935483870968			138	138	137	134	133	123
0.774193548387097			134	134	132	130	129	119
0.806451612903226			114	114	112	110	110	98.29
0.838709677419355			103	102	101	101	99.42	91.83
0.870967741935484			102	102	101	98.7	97.43	86.44
0.903225806451613			97.65	97.4	96.53	93.91	91.51	72.98
0.935483870967742			79.45	79.19	78.7	77.36	76.07	68.63
0.967741935483871			40.43	40.31	39.8	38.81	38.27	26.39
0.1	183.9	182.9	181	179.8	178.6	154.8		

Average of yearly averages: 128.518666666667

Inputs generated by pe5.pl - Novemeber 2006

Data used for this run:
Output File: LATFAIR
Metfile: w13970.dvf
PRZM scenario: LAsugarcaneSTD.txt
EXAMS environment file: pond298.exv

Chemical Name: Myclobutanil

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	288.8	g/mol	
Henry's Law Const.	henry		atm-m^3/mol	
Vapor Pressure	vapr		torr	
Solubility	sol	142	mg/L	
Kd Kd	Kd	2.39	mg/L	
Koc Koc			mg/L	
Photolysis half-life	kdp		days	Half-life
Aerobic Aquatic Metabolism	kbacw	502	days	Halfife
Anaerobic Aquatic Metabolism	kbacs		days	Halfife
Aerobic Soil Metabolism	asm	251	days	Halfife
Hydrolysis: pH 7		days	Half-life	
Method: CAM 2	integer	See PRZM manual		
Incorporation Depth:	DEPI		cm	
Application Rate:	TAPP	0.28	kg/ha	
Application Efficiency:		APPEFF	0.95	fraction
Spray Drift	DRFT	0.05	fraction of application rate applied to pond	
Application Date	Date	1-3	dd/mm or dd/mmm or dd-mm or dd-mmm	
Interval 1	interval	14	days	Set to 0 or delete line for single app.
app. rate 1	apprate	0.28	kg/ha	
Interval 2	interval	14	days	Set to 0 or delete line for single app.
app. rate 2	apprate	0.28	kg/ha	
Interval 3	interval	14	days	Set to 0 or delete line for single app.
app. rate 3	apprate	0.28	kg/ha	
Interval 4	interval	14	days	Set to 0 or delete line for single app.
app. rate 4	apprate	0.28	kg/ha	
Interval 5	interval	14	days	Set to 0 or delete line for single app.
app. rate 5	apprate	0.28	kg/ha	
Interval 6	interval	14	days	Set to 0 or delete line for single app.
app. rate 6	apprate	0.28	kg/ha	
Interval 7	interval	14	days	Set to 0 or delete line for single app.
app. rate 7	apprate	0.28	kg/ha	
Record 17:	FILTRA			
IPSCND				
UPTKF				
Record 18:	PLVKRT			
PLDKRT				
FEXTRC	0.5			
Flag for Index Res. Run	IR	EPA Pond		
Flag for runoff calc.	RUNOFF	none	none, monthly or total(average of entire run)	

LA Tropical Fruit ground

stored as LATFGRD.out
Chemical: Myclobutanil
PRZM environment: LAsugarcaneSTD.txt modified Tueday, 29 May 2007 at 12:56:00
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 16:33:30
Metfile: w13970.dvf modified Wedday, 3 July 2002 at 09:05:36
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	38.08	37.96	37.49	36.47	35.96	24.79
1962	94.55	94.31	93.51	91.01	88.69	66.03
1963	74.15	73.99	73.75	73.18	72.66	68.67
1964	96.62	96.29	95.22	93.15	91.5	81.32
1965	95.57	95.32	94.19	93.66	92.56	85.88
1966	107	107	105	102	102	91.79
1967	179	179	176	175	174	140
1968	144	144	143	142	142	134
1969	158	158	156	152	149	137
1970	157	157	155	154	152	139
1971	140	140	138	137	136	127
1972	163	163	161	157	155	133
1973	172	171	169	167	165	145
1974	146	145	144	144	143	133
1975	161	160	159	157	156	137
1976	161	161	160	157	156	139
1977	162	162	160	156	154	140
1978	153	152	151	148	148	135
1979	170	170	168	166	165	147
1980	216	215	212	205	204	177
1981	185	184	182	179	178	167

1982	155	155	153	152	151	142
1983	176	176	175	171	169	149
1984	148	148	146	145	143	136
1985	131	130	129	126	124	118
1986	140	139	139	136	133	116
1987	130	130	129	128	127	116
1988	126	125	124	122	121	111
1989	151	150	150	147	144	124
1990	136	135	135	133	132	123

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly	
0.032258064516129			216	215	212	205	204	177
0.0645161290322581			185	184	182	179	178	167
0.0967741935483871			179	179	176	175	174	149
0.129032258064516			176	176	175	171	169	147
0.161290322580645			172	171	169	167	165	145
0.193548387096774			170	170	168	166	165	142
0.225806451612903			163	163	161	157	156	140
0.258064516129032			162	162	160	157	156	140
0.290322580645161			161	161	160	157	155	139
0.32258064516129			161	160	159	156	154	139
0.354838709677419			158	158	156	154	152	137
0.387096774193548			157	157	155	152	151	137
0.419354838709677			155	155	153	152	149	136
0.451612903225806			153	152	151	148	148	135
0.483870967741936			151	150	150	147	144	134
0.516129032258065			148	148	146	145	143	133
0.548387096774194			146	145	144	144	143	133
0.580645161290323			144	144	143	142	142	127
0.612903225806452			140	140	139	137	136	124
0.645161290322581			140	139	138	136	133	123
0.67741935483871			136	135	135	133	132	118
0.709677419354839			131	130	129	128	127	116
0.741935483870968			130	130	129	126	124	116
0.774193548387097			126	125	124	122	121	111
0.806451612903226			107	107	105	102	102	91.79
0.838709677419355			96.62	96.29	95.22	93.66	92.56	85.88
0.870967741935484			95.57	95.32	94.19	93.15	91.5	81.32
0.903225806451613			94.55	94.31	93.51	91.01	88.69	68.67
0.935483870967742			74.15	73.99	73.75	73.18	72.66	66.03
0.967741935483871			38.08	37.96	37.49	36.47	35.96	24.79
0.1	178.7	178.7	175.9	174.6	173.5	148.8	

Average of yearly averages: 122.782666666667

Inputs generated by pe5.pl - Novemeber 2006

Data used for this run:
Output File: LATFGRD
Metfile: w13970.dvf
PRZM scenario: LAsugarcaneSTD.txt
EXAMS environment file: pond298.exv
Chemical Name: Myclobutanil

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	288.8	g/mol	
Henry's Law Const.	henry		atm-m^3/mol	
Vapor Pressure	vapr		torr	
Solubility	sol	142	mg/L	
Kd Kd	2.39	mg/L		
Koc Koc		mg/L		
Photolysis half-life	kdp		days	Half-life
Aerobic Aquatic Metabolism	kbacw	502	days	Halfife
Anaerobic Aquatic Metabolism	kbacs		days	Halfife
Aerobic Soil Metabolism	asm	251	days	Halfife
Hydrolysis: pH 7		days	Half-life	
Method: CAM	2	integer	See PRZM manual	
Incorporation Depth:	DEPI		cm	
Application Rate:	TAPP	0.28	kg/ha	
Application Efficiency:	APPEFF	0.99	fraction	
Spray Drift	DRFT	0.01	fraction of application rate applied to pond	
Application Date	Date	1-3	dd/mm or dd/mmm or dd-mm or dd-mmm	
Interval 1	interval	14	days	Set to 0 or delete line for single app.
app. rate 1	apprate	0.28	kg/ha	
Interval 2	interval	14	days	Set to 0 or delete line for single app.
app. rate 2	apprate	0.28	kg/ha	

Interval 3	interval	14	days	Set to 0 or delete line for single app.
app. rate 3	apprate 0.28	kg/ha		
Interval 4	interval	14	days	Set to 0 or delete line for single app.
app. rate 4	apprate 0.28	kg/ha		
Interval 5	interval	14	days	Set to 0 or delete line for single app.
app. rate 5	apprate 0.28	kg/ha		
Interval 6	interval	14	days	Set to 0 or delete line for single app.
app. rate 6	apprate 0.28	kg/ha		
Interval 7	interval	14	days	Set to 0 or delete line for single app.
app. rate 7	apprate 0.28	kg/ha		
Record 17:	FILTRA			
IPSCND				
UPTKF				
Record 18:	PLVKRT			
PLDKRT				
FEXTRC	0.5			
Flag for Index Res. Run		IR	EPA Pond	
Flag for runoff calc.	RUNOFF	none	none, monthly or total(average of entire run)	

CA Tropical Fruit air

stored as CATFAIR.out
Chemical: Myclobutanil
PRZM environment: CAcitrus_WirrigSTD.txt modified Tueday, 29 May 2007 at 12:41:26
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 16:33:30
Metfile: w23155.dvf modified Wedday, 3 July 2002 at 09:04:20
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	5.238	5.222	5.158	5.023	4.906	3.871
1962	12.79	12.76	12.62	12.37	12.2	10.19
1963	19.25	19.22	19.07	18.77	18.51	15.91
1964	19.2	19.17	19.03	18.76	18.57	16.57
1965	19.87	19.84	19.68	19.39	19.18	17.07
1966	20.39	20.34	20.16	19.86	19.66	17.53
1967	20.72	20.69	20.58	20.27	20.05	17.79
1968	20	19.96	19.79	19.49	19.27	17.1
1969	19.9	19.86	19.71	19.39	19.16	16.88
1970	19.34	19.3	19.16	18.87	18.66	16.59
1971	20.21	20.18	20.02	19.75	19.59	17.51
1972	19.69	19.62	19.43	19.14	19.11	17.53
1973	21.11	21.07	20.89	20.58	20.34	17.95
1974	21.8	21.76	21.58	21.27	21.06	18.43
1975	21.07	21.04	20.93	20.63	20.41	18.12
1976	20.28	20.24	20.11	19.81	19.59	17.39
1977	20.51	20.47	20.27	20	19.73	17.45
1978	28.49	28.43	28.2	27.91	27.68	23.62
1979	24.9	24.85	24.66	24.34	24.11	21.42
1980	22.48	22.44	22.28	22.04	21.84	19.6
1981	21.8	21.75	21.57	21.27	21.01	18.58
1982	20.98	20.94	20.77	20.4	20.11	17.8
1983	21.21	21.18	21.05	20.76	20.55	18.43
1984	20.66	20.63	20.49	20.2	19.99	17.82
1985	19.98	19.94	19.76	19.49	19.29	17.28
1986	19.81	19.77	19.63	19.35	19.14	17.12
1987	20.34	20.29	20.11	19.81	19.6	17.65
1988	20.36	20.32	20.22	19.97	19.77	17.63
1989	20.16	20.12	19.94	19.65	19.46	17.39
1990	19.74	19.69	19.52	19.25	19.05	16.99

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly		
0.032258064516129		28.49	28.43	28.2	27.91	27.68	23.62	
0.0645161290322581		24.9	24.85	24.66	24.34	24.11	21.42	
0.0967741935483871		22.48	22.44	22.28	22.04	21.84	19.6	
0.129032258064516		21.8	21.76	21.58	21.27	21.06	18.58	
0.161290322580645		21.8	21.75	21.57	21.27	21.01	18.43	
0.193548387096774		21.21	21.18	21.05	20.76	20.55	18.43	
0.225806451612903		21.11	21.07	20.93	20.63	20.41	18.12	
0.258064516129032		21.07	21.04	20.89	20.58	20.34	17.95	
0.290322580645161		20.98	20.94	20.77	20.4	20.11	17.82	
0.32258064516129		20.72	20.69	20.58	20.27	20.05	17.8	
0.354838709677419		20.66	20.63	20.49	20.2	19.99	17.79	
0.387096774193548		20.51	20.47	20.27	20	19.77	17.65	
0.419354838709677		20.39	20.34	20.22	19.97	19.73	17.63	

```
0.451612903225806     20.36   20.32   20.16   19.86   19.66   17.53
0.483870967741936     20.34   20.29   20.11   19.81   19.6    17.53
0.516129032258065     20.28   20.24   20.11   19.81   19.59   17.51
0.548387096774194     20.21   20.18   20.02   19.75   19.59   17.45
0.580645161290323     20.16   20.12   19.94   19.65   19.46   17.39
0.612903225806452     20      19.96   19.79   19.49   19.29   17.39
0.645161290322581     19.98   19.94   19.76   19.49   19.27   17.28
0.67741935483871      19.9    19.86   19.71   19.39   19.18   17.12
0.709677419354839     19.87   19.84   19.68   19.39   19.16   17.1
0.741935483870968     19.81   19.77   19.63   19.35   19.14   17.07
0.774193548387097     19.74   19.69   19.52   19.25   19.11   16.99
0.806451612903226     19.69   19.62   19.43   19.14   19.05   16.88
0.838709677419355     19.34   19.3    19.16   18.87   18.66   16.59
0.870967741935484     19.25   19.22   19.07   18.77   18.57   16.57
0.903225806451613     19.2    19.17   19.03   18.76   18.51   15.91
0.935483870967742     12.79   12.76   12.62   12.37   12.2    10.19
0.967741935483871     5.238   5.222   5.158   5.023   4.906   3.871

0.1     22.412  22.372  22.21   21.963  21.762  19.498
                                        Average of yearly averages:   17.1737

Inputs generated by pe5.pl - Novemeber 2006

Data used for this run:
Output File: CATFAIR
Metfile:        w23155.dvf
PRZM scenario: CAcitrus_WirrigSTD.txt
EXAMS environment file:         pond298.exv
Chemical Name: Myclobutanil
Description     Variable Name   Value   Units   Comments
Molecular weight        mwt     288.8   g/mol
Henry's Law Const.      henry           atm-m^3/mol
Vapor Pressure vapr             torr
Solubility      sol     142     mg/L
Kd      Kd      2.39    mg/L
Koc     Koc             mg/L
Photolysis half-life    kdp             days    Half-life
Aerobic Aquatic Metabolism      kbacw   502     days    Halfife
Anaerobic Aquatic Metabolism    kbacs           days    Halfife
Aerobic Soil Metabolism         asm     251     days    Halfife
Hydrolysis:     pH 7            days    Half-life
Method: CAM     2       integer See PRZM manual
Incorporation Depth:    DEPI            cm
Application Rate:       TAPP    0.28    kg/ha
Application Efficiency:         APPEFF  0.95    fraction
Spray Drift     DRFT    0.05    fraction of application rate applied to pond
Application Date        Date    1-1     dd/mm or dd/mmm or dd-mm or dd-mmm
Interval 1      interval        14      days    Set to 0 or delete line for single app.
app. rate 1     apprate 0.28    kg/ha
Interval 2      interval        14      days    Set to 0 or delete line for single app.
app. rate 2     apprate 0.28    kg/ha
Interval 3      interval        14      days    Set to 0 or delete line for single app.
app. rate 3     apprate 0.28    kg/ha
Interval 4      interval        14      days    Set to 0 or delete line for single app.
app. rate 4     apprate 0.28    kg/ha
Interval 5      interval        14      days    Set to 0 or delete line for single app.
app. rate 5     apprate 0.28    kg/ha
Interval 6      interval        14      days    Set to 0 or delete line for single app.
app. rate 6     apprate 0.28    kg/ha
Interval 7      interval        14      days    Set to 0 or delete line for single app.
app. rate 7     apprate 0.28    kg/ha
Record 17:      FILTRA
        IPSCND
        UPTKF
Record 18:      PLVKRT
        PLDKRT
        FEXTRC  0.5
Flag for Index Res. Run         IR      EPA Pond
Flag for runoff calc.  RUNOFF   none    none, monthly or total(average of entire run)
```

LA Tropical Fruit ground

stored as CATFGRD.out

Chemical: Myclobutanil
PRZM environment: CAcitrus_WirrigSTD.txt modified Tueday, 29 May 2007 at 12:41:26
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 16:33:30
Metfile: w23155.dvf modified Wedday, 3 July 2002 at 09:04:20
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	1.058	1.055	1.043	1.016	0.9921	0.7842
1962	5.906	5.892	5.842	5.8	5.761	4.616
1963	10.44	10.42	10.37	10.22	10.06	8.503
1964	8.645	8.631	8.578	8.531	8.482	7.675
1965	8.218	8.203	8.145	8.062	7.994	7.124
1966	7.835	7.818	7.767	7.714	7.672	6.87
1967	7.613	7.603	7.563	7.464	7.403	6.634
1968	6.74	6.727	6.675	6.586	6.521	5.823
1969	6.39	6.378	6.329	6.232	6.171	5.447
1970	6.312	6.3	6.255	5.772	5.728	5.237
1971	6.83	6.818	6.769	6.716	6.697	6.115
1972	7.077	7.051	6.995	6.772	6.597	5.991
1973	7.419	7.405	7.348	7.284	7.218	6.391
1974	8.255	8.238	8.191	8.147	8.051	6.968
1975	7.558	7.547	7.527	7.462	7.415	6.642
1976	6.676	6.665	6.634	6.572	6.528	5.837
1977	6.893	6.877	6.824	6.751	6.66	5.939
1978	15.75	15.7	15.59	15.48	15.39	12.55
1979	11.69	11.67	11.63	11.59	11.55	10.29
1980	9.263	9.247	9.196	9.167	9.123	8.29
1981	8.298	8.282	8.231	8.136	8.036	7.19
1982	7.555	7.541	7.484	7.36	7.229	6.437
1983	7.697	7.685	7.652	7.592	7.543	6.842
1984	6.869	6.859	6.822	6.761	6.715	6.043
1985	5.99	5.978	5.929	5.871	5.825	5.311
1986	5.648	5.639	5.6	5.538	5.492	4.948
1987	6.019	6.006	5.953	5.899	5.852	5.374
1988	6.129	6.118	6.071	6.007	5.963	5.362
1989	5.878	5.869	5.823	5.763	5.723	5.136
1990	5.335	5.325	5.281	5.222	5.18	4.662

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly		
0.032258064516129		15.75	15.7	15.59	15.48	15.39	12.55	
0.0645161290322581		11.69	11.67	11.63	11.59	11.55	10.29	
0.0967741935483871		10.44	10.42	10.37	10.22	10.06	8.503	
0.129032258064516		9.263	9.247	9.196	9.167	9.123	8.29	
0.161290322580645		8.645	8.631	8.578	8.531	8.482	7.675	
0.193548387096774		8.298	8.282	8.231	8.147	8.051	7.19	
0.225806451612903		8.255	8.238	8.191	8.136	8.036	7.124	
0.258064516129032		8.218	8.203	8.145	8.062	7.994	6.968	
0.290322580645161		7.835	7.818	7.767	7.714	7.672	6.87	
0.32258064516129		7.697	7.685	7.652	7.592	7.543	6.842	
0.354838709677419		7.613	7.603	7.563	7.464	7.415	6.642	
0.387096774193548		7.558	7.547	7.527	7.462	7.403	6.634	
0.419354838709677		7.555	7.541	7.484	7.36	7.229	6.437	
0.451612903225806		7.419	7.405	7.348	7.284	7.218	6.391	
0.483870967741936		7.077	7.051	6.995	6.772	6.715	6.115	
0.516129032258065		6.893	6.877	6.824	6.761	6.697	6.043	
0.548387096774194		6.869	6.859	6.822	6.751	6.66	5.991	
0.580645161290323		6.83	6.818	6.769	6.716	6.597	5.939	
0.612903225806452		6.74	6.727	6.675	6.586	6.528	5.837	
0.645161290322581		6.676	6.665	6.634	6.572	6.521	5.823	
0.67741935483871		6.39	6.378	6.329	6.232	6.171	5.447	
0.709677419354839		6.312	6.3	6.255	6.007	5.963	5.374	
0.741935483870968		6.129	6.118	6.071	5.899	5.852	5.362	
0.774193548387097		6.019	6.006	5.953	5.871	5.825	5.311	
0.806451612903226		5.99	5.978	5.929	5.8	5.761	5.237	
0.838709677419355		5.906	5.892	5.842	5.772	5.728	5.136	
0.870967741935484		5.878	5.869	5.823	5.763	5.723	4.948	
0.903225806451613		5.648	5.639	5.6	5.538	5.492	4.662	
0.935483870967742		5.335	5.325	5.281	5.222	5.18	4.616	
0.967741935483871		1.058	1.055	1.043	1.016	0.9921	0.7842	

0.1 10.3223 10.3027 10.2526 10.1147 9.9663 8.4817
Average of yearly averages: 6.36770666666667

Inputs generated by pe5.pl - Novemeber 2006

```
Data used for this run:
Output File: CATFGRD
Metfile:        w23155.dvf
PRZM scenario: CAcitrus_WirrigSTD.txt
EXAMS environment file:         pond298.exv
Chemical Name: Myclobutanil
Description     Variable Name   Value   Units   Comments
Molecular weight        mwt     288.8   g/mol
Henry's Law Const.      henry           atm-m^3/mol
Vapor Pressure vapr             torr
Solubility      sol     142     mg/L
Kd      Kd      2.39    mg/L
Koc     Koc             mg/L
Photolysis half-life    kdp             days    Half-life
Aerobic Aquatic Metabolism      kbacw   502     days    Halfife
Anaerobic Aquatic Metabolism    kbacs           days    Halfife
Aerobic Soil Metabolism         asm     251     days    Halfife
Hydrolysis:     pH 7            days    Half-life
Method: CAM     2       integer See PRZM manual
Incorporation Depth:    DEPI            cm
Application Rate:       TAPP    0.28    kg/ha
Application Efficiency:         APPEFF  0.99    fraction
Spray Drift     DRFT    0.01    fraction of application rate applied to pond
Application Date        Date    1-1     dd/mm or dd/mmm or dd-mm or dd-mmm
Interval 1      interval        14      days    Set to 0 or delete line for single app.
app. rate 1     apprate 0.28    kg/ha
Interval 2      interval        14      days    Set to 0 or delete line for single app.
app. rate 2     apprate 0.28    kg/ha
Interval 3      interval        14      days    Set to 0 or delete line for single app.
app. rate 3     apprate 0.28    kg/ha
Interval 4      interval        14      days    Set to 0 or delete line for single app.
app. rate 4     apprate 0.28    kg/ha
Interval 5      interval        14      days    Set to 0 or delete line for single app.
app. rate 5     apprate 0.28    kg/ha
Interval 6      interval        14      days    Set to 0 or delete line for single app.
app. rate 6     apprate 0.28    kg/ha
Interval 7      interval        14      days    Set to 0 or delete line for single app.
app. rate 7     apprate 0.28    kg/ha
Record 17:      FILTRA
        IPSCND
        UPTKF
Record 18:      PLVKRT
        PLDKRT
        FEXTRC  0.5
Flag for Index Res. Run         IR      EPA Pond
Flag for runoff calc.   RUNOFF  none    none, monthly or total(average of entire run)
```

Appendix C. PRZM/EXAMS OUTPUTS for Myclobutanil plus 1,2,4-triazole.

CA artichokes aerial spray myclobutanil plus 1,2,4-triazole ASM = 315 days, AAqM = 630 days, Kd = 0.719 mg/L

```
stored as CAArtAir.out
Chemical: Myclobutanil total
PRZM environment: CARowCropRLF.txt    modified Monday, 19 February 2007 at 22:04:10
EXAMS environment: pond298.exv        modified Thuday, 29 August 2002 at 16:33:30
Metfile: w23234.dvf    modified Tueday, 2 July 2002 at 19:04:22
Water segment concentrations (ppb)

Year    Peak    96 hr   21 Day  60 Day  90 Day  Yearly
1961    2.702   2.697   2.679   2.639   2.61    1.89
1962    5.335   5.329   5.304   5.25    5.166   4.325
1963    9.373   9.361   9.314   9.219   9.159   7.932
1964    10.87   10.86   10.81   10.74   10.69   9.829
1965    12.76   12.75   12.7    12.59   12.52   11.55
```

1966	13.91	13.89	13.83	13.72	13.65	12.82
1967	16.38	16.36	16.28	16.21	16.15	14.92
1968	17.15	17.13	17.06	16.94	16.86	15.8
1969	17.19	17.17	17.09	16.97	16.89	15.94
1970	18.1	18.08	17.99	17.88	17.8	16.63
1971	18.07	18.05	17.97	17.86	17.78	16.8
1972	17.92	17.9	17.82	17.71	17.63	16.69
1973	18.13	18.11	18.03	17.91	17.83	16.86
1974	19.43	19.41	19.33	19.21	19.13	17.84
1975	20.44	20.41	20.32	20.21	20.12	18.81
1976	20.33	20.31	20.22	20.11	20.02	18.92
1977	19.87	19.85	19.76	19.65	19.57	18.57
1978	20.43	20.41	20.3	20.18	20.03	18.77
1979	19.58	19.56	19.47	19.36	19.28	18.47
1980	20.22	20.2	20.11	20	19.92	18.82
1981	19.57	19.55	19.46	19.35	19.25	18.36
1982	21.27	21.25	21.15	21.05	20.97	19.52
1983	21.6	21.58	21.48	21.33	21.22	19.97
1984	20.71	20.69	20.58	20.49	20.39	19.33
1985	20.04	20.02	19.93	19.82	19.73	18.74
1986	19.34	19.32	19.23	19.12	19.03	18.11
1987	18.87	18.84	18.75	18.64	18.55	17.57
1988	20.04	20.02	19.92	19.82	19.7	18.3
1989	19.39	19.37	19.28	19.17	19.08	18.26
1990	19.84	19.82	19.72	19.48	19.35	18.36

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly		
0.032258064516129			21.6	21.58	21.48	21.33	21.22	19.97
0.0645161290322581			21.27	21.25	21.15	21.05	20.97	19.52
0.0967741935483871			20.71	20.69	20.58	20.49	20.39	19.33
0.129032258064516			20.44	20.41	20.32	20.21	20.12	18.92
0.161290322580645			20.43	20.41	20.3	20.18	20.03	18.82
0.193548387096774			20.33	20.31	20.22	20.11	20.02	18.81
0.225806451612903			20.22	20.2	20.11	20	19.92	18.77
0.258064516129032			20.04	20.02	19.93	19.82	19.73	18.74
0.290322580645161			20.04	20.02	19.92	19.82	19.7	18.57
0.32258064516129			19.87	19.85	19.76	19.65	19.57	18.47
0.354838709677419			19.84	19.82	19.72	19.48	19.35	18.36
0.387096774193548			19.58	19.56	19.47	19.36	19.28	18.36
0.419354838709677			19.57	19.55	19.46	19.35	19.25	18.3
0.451612903225806			19.43	19.41	19.33	19.21	19.13	18.26
0.483870967741936			19.39	19.37	19.28	19.17	19.08	18.11
0.516129032258065			19.34	19.32	19.23	19.12	19.03	17.84
0.548387096774194			18.87	18.84	18.75	18.64	18.55	17.57
0.580645161290323			18.13	18.11	18.03	17.91	17.83	16.86
0.612903225806452			18.1	18.08	17.99	17.88	17.8	16.8
0.645161290322581			18.07	18.05	17.97	17.86	17.78	16.69
0.67741935483871			17.92	17.9	17.82	17.71	17.63	16.63
0.709677419354839			17.19	17.17	17.09	16.97	16.89	15.94
0.741935483870968			17.15	17.13	17.06	16.94	16.86	15.8
0.774193548387097			16.38	16.36	16.28	16.21	16.15	14.92
0.806451612903226			13.91	13.89	13.83	13.72	13.65	12.82
0.838709677419355			12.76	12.75	12.7	12.59	12.52	11.55
0.870967741935484			10.87	10.86	10.81	10.74	10.69	9.829
0.903225806451613			9.373	9.361	9.314	9.219	9.159	7.932
0.935483870967742			5.335	5.329	5.304	5.25	5.166	4.325
0.967741935483871			2.702	2.697	2.679	2.639	2.61	1.89

0.1	20.683	20.662	20.554	20.462	20.363	19.289

Average of yearly averages: 15.9568666666667

Inputs generated by pe5.pl - Novemeber 2006

Data used for this run:
Output File: CAArtAir
Metfile: w23234.dvf
PRZM scenario: CARowCropRLF.txt
EXAMS environment file: pond298.exv
Chemical Name: Myclobutanil total

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	288.8	g/mol	
Henry's Law Const.	henry		atm-m^3/mol	
Vapor Pressure	vapr		torr	
Solubility	sol	142	mg/L	
Kd	Kd	0.719	mg/L	

```
Koc     Koc              mg/L
Photolysis half-life     kdp            days    Half-life
Aerobic Aquatic Metabolism    kbacw     630     days    Halfife
Anaerobic Aquatic Metabolism  kbacs             days    Halfife
Aerobic Soil Metabolism       asm       315     days    Halfife
Hydrolysis:     pH 7          days      Half-life
Method: CAM     2        integer See PRZM manual
Incorporation Depth:     DEPI           cm
Application Rate:        TAPP      0.112   kg/ha
Application Efficiency:           APPEFF  0.95    fraction
Spray Drift     DRFT     0.05     fraction of application rate applied to pond
Application Date         Date      1-3     dd/mm or dd/mmm or dd-mm or dd-mmm
Interval 1      interval          14      days    Set to 0 or delete line for single app.
app. rate 1     apprate 0.112     kg/ha
Interval 2      interval          14      days    Set to 0 or delete line for single app.
app. rate 2     apprate 0.112     kg/ha
Interval 3      interval          14      days    Set to 0 or delete line for single app.
app. rate 3     apprate 0.112     kg/ha
Interval 4      interval          14      days    Set to 0 or delete line for single app.
app. rate 4     apprate 0.112     kg/ha
Interval 5      interval          14      days    Set to 0 or delete line for single app.
app. rate 5     apprate 0.112     kg/ha
Record 17:      FILTRA
        IPSCND
        UPTKF
Record 18:      PLVKRT
        PLDKRT
        FEXTRC  0.5
Flag for Index Res. Run          IR       EPA Pond
Flag for runoff calc.  RUNOFF    none     none, monthly or total(average of entire run)
```

CA artichokes ground spray myclobutanil plus 1,2,4-triazole ASM = 315 days, AAqM = 630 days, Kd = 0.719 mg/L

```
stored as CAArtGRD.out
Chemical: Myclobutanil total
PRZM environment: CARowCropRLF.txt    modified Monday, 19 February 2007 at 22:04:10
EXAMS environment: pond298.exv        modified Thuday, 29 August 2002 at 16:33:30
Metfile: w23234.dvf    modified Tueday, 2 July 2002 at 19:04:22
Water segment concentrations (ppb)
```

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	1.442	1.439	1.43	1.411	1.399	1.019
1962	3.283	3.278	3.261	3.226	3.145	2.456
1963	6.306	6.298	6.283	6.255	6.211	5.288
1964	7.07	7.063	7.046	7.029	7.02	6.494
1965	8.367	8.359	8.341	8.311	8.265	7.615
1966	8.986	8.976	8.953	8.931	8.879	8.372
1967	11.13	11.11	11.06	10.98	10.97	10.1
1968	11.54	11.53	11.51	11.47	11.4	10.65
1969	11.22	11.21	11.18	11.14	11.07	10.46
1970	11.96	11.95	11.92	11.87	11.8	10.95
1971	11.65	11.64	11.61	11.57	11.5	10.87
1972	11.28	11.27	11.25	11.22	11.16	10.56
1973	11.35	11.33	11.31	11.26	11.19	10.57
1974	12.59	12.57	12.54	12.49	12.41	11.46
1975	13.47	13.46	13.43	13.38	13.29	12.31
1976	13.23	13.22	13.19	13.14	13.06	12.31
1977	12.67	12.66	12.64	12.59	12.52	11.88
1978	13.24	13.22	13.18	13.05	12.94	12.07
1979	12.33	12.32	12.29	12.24	12.17	11.72
1980	12.99	12.98	12.95	12.91	12.83	12.08
1981	12.25	12.24	12.22	12.17	12.09	11.57
1982	14.02	14.01	13.99	13.92	13.83	12.72
1983	14.25	14.23	14.2	14.1	14.03	13.18
1984	13.49	13.47	13.44	13.36	13.28	12.6
1985	12.77	12.76	12.73	12.67	12.59	11.98
1986	12.04	12.02	12	11.96	11.88	11.32
1987	11.54	11.53	11.5	11.44	11.36	10.76
1988	12.8	12.79	12.75	12.67	12.58	11.57
1989	12.16	12.15	12.12	12.05	11.97	11.52
1990	12.6	12.59	12.52	12.37	12.25	11.63

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly	
0.032258064516129		14.25	14.23	14.2	14.1	14.03	13.18
0.0645161290322581		14.02	14.01	13.99	13.92	13.83	12.72
0.0967741935483871		13.49	13.47	13.44	13.38	13.29	12.6
0.129032258064516		13.47	13.46	13.43	13.36	13.28	12.31
0.161290322580645		13.24	13.22	13.19	13.14	13.06	12.31
0.193548387096774		13.23	13.22	13.18	13.05	12.94	12.08
0.225806451612903		12.99	12.98	12.95	12.91	12.83	12.07
0.258064516129032		12.8	12.79	12.75	12.67	12.59	11.98
0.290322580645161		12.77	12.76	12.73	12.67	12.58	11.88
0.32258064516129		12.67	12.66	12.64	12.59	12.52	11.72
0.354838709677419		12.6	12.59	12.54	12.49	12.41	11.63
0.387096774193548		12.59	12.57	12.52	12.37	12.25	11.57
0.419354838709677		12.33	12.32	12.29	12.24	12.17	11.57
0.451612903225806		12.25	12.24	12.22	12.17	12.09	11.52
0.483870967741936		12.16	12.15	12.12	12.05	11.97	11.46
0.516129032258065		12.04	12.02	12	11.96	11.88	11.32
0.548387096774194		11.96	11.95	11.92	11.87	11.8	10.95
0.580645161290323		11.65	11.64	11.61	11.57	11.5	10.87
0.612903225806452		11.54	11.53	11.51	11.47	11.4	10.76
0.645161290322581		11.54	11.53	11.5	11.44	11.36	10.65
0.67741935483871		11.35	11.33	11.31	11.26	11.19	10.57
0.709677419354839		11.28	11.27	11.25	11.22	11.16	10.56
0.741935483870968		11.22	11.21	11.18	11.14	11.07	10.46
0.774193548387097		11.13	11.11	11.06	10.98	10.97	10.1
0.806451612903226		8.986	8.976	8.953	8.931	8.879	8.372
0.838709677419355		8.367	8.359	8.341	8.311	8.265	7.615
0.870967741935484		7.07	7.063	7.046	7.029	7.02	6.494
0.903225806451613		6.306	6.298	6.283	6.255	6.211	5.288
0.935483870967742		3.283	3.278	3.261	3.226	3.145	2.456
0.967741935483871		1.442	1.439	1.43	1.411	1.399	1.019
0.1	13.488	13.469	13.439	13.378	13.289	12.571	

Average of yearly averages: 10.2694666666667

Inputs generated by pe5.pl - Novemeber 2006

Data used for this run:
Output File: CAArtGRD
Metfile: w23234.dvf
PRZM scenario: CARowCropRLF.txt
EXAMS environment file: pond298.exv
Chemical Name: Myclobutanil total

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	288.8	g/mol	
Henry's Law Const.	henry		atm-m^3/mol	
Vapor Pressure vapr		torr		
Solubility	sol	142	mg/L	
Kd Kd	0.719	mg/L		
Koc Koc		mg/L		
Photolysis half-life	kdp		days	Half-life
Aerobic Aquatic Metabolism	kbacw	630	days	Halfife
Anaerobic Aquatic Metabolism	kbacs		days	Halfife
Aerobic Soil Metabolism	asm	315	days	Halfife
Hydrolysis: pH 7		days	Half-life	
Method: CAM 2	integer	See PRZM manual		
Incorporation Depth:	DEPI		cm	
Application Rate:	TAPP	0.112	kg/ha	
Application Efficiency:		APPEFF	0.99	fraction
Spray Drift	DRFT	0.01	fraction of application rate applied to pond	
Application Date	Date	1-3	dd/mm or dd/mmm or dd-mm or dd-mmm	
Interval 1	interval	14	days	Set to 0 or delete line for single app.
app. rate 1	apprate	0.112	kg/ha	
Interval 2	interval	14	days	Set to 0 or delete line for single app.
app. rate 2	apprate	0.112	kg/ha	
Interval 3	interval	14	days	Set to 0 or delete line for single app.
app. rate 3	apprate	0.112	kg/ha	
Interval 4	interval	14	days	Set to 0 or delete line for single app.
app. rate 4	apprate	0.112	kg/ha	
Interval 5	interval	14	days	Set to 0 or delete line for single app.
app. rate 5	apprate	0.112	kg/ha	
Record 17:	FILTRA			
IPSCND				
UPTKF				
Record 18:	PLVKRT			
PLDKRT				

FEXTRC 0.5
Flag for Index Res. Run IR EPA Pond
Flag for runoff calc. RUNOFF none none, monthly or total(average of entire run)

CA lettuce aerial spray myclobutanil plus 1,2,4-triazole ASM = 315 days, AAqM = 630 days, Kd = 0.719 mg/L

stored as CALetAir.out
Chemical: Myclobutanil total
PRZM environment: CAlettuceSTD.txt modified Tueday, 21 February 2006 at 00:38:22
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 16:33:30
Metfile: w23273.dvf modified Wedday, 3 July 2002 at 09:04:22
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	29.4	29.36	29.18	20.45	14.88	5.277
1962	31.55	31.51	31.37	31.07	30.93	30.35
1963	42.38	42.32	42.11	41.88	41.56	39.39
1964	60.23	60.18	59.92	59.36	54.42	45.36
1965	65.96	65.9	65.64	63.11	61.03	59.31
1966	69.73	69.66	69.42	67.93	65.28	63.56
1967	69.2	69.13	69.01	68.86	68.74	67.44
1968	81.5	81.39	81.17	80.88	78.56	68.33
1969	81.94	81.86	81.68	81.37	81.13	79.42
1970	95.68	95.58	95.21	87.49	83.76	80.74
1971	96.26	96.17	95.9	95.42	94.96	92.4
1972	92.43	92.34	92.02	90.7	88.67	86.44
1973	90.59	90.52	90.22	89.57	89.48	87.45
1974	114	114	113	103	97.1	90.26
1975	113	113	113	112	112	108
1976	117	117	117	115	115	105
1977	117	117	116	116	115	111
1978	130	130	129	127	127	114
1979	124	124	123	123	123	119
1980	117	117	116	116	116	112
1981	115	115	115	115	114	111
1982	109	109	108	108	108	105
1983	101	101	101	100	100	98.14
1984	95.32	95.24	94.92	94.25	93.94	90.59
1985	90.03	89.95	89.73	87.96	87.61	85.58
1986	95.03	94.96	94.68	93.27	92.74	89.81
1987	94.36	94.28	94.1	93.82	93.6	92
1988	95.14	95.05	94.86	94.48	94.12	91.17
1989	90.39	90.32	90.05	89.49	89.22	86.01
1990	81.95	81.89	81.68	81.37	81.23	78.68

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	130	130	129	127	127	119
0.0645161290322581	124	124	123	123	123	114
0.0967741935483871	117	117	117	116	116	112
0.129032258064516	117	117	116	116	115	111
0.161290322580645	117	117	116	115	115	111
0.193548387096774	115	115	115	115	114	108
0.225806451612903	114	114	113	112	112	105
0.258064516129032	113	113	113	108	108	105
0.290322580645161	109	109	108	103	100	98.14
0.32258064516129	101	101	101	100	97.1	92.4
0.354838709677419	96.26	96.17	95.9	95.42	94.96	92
0.387096774193548	95.68	95.58	95.21	94.48	94.12	91.17
0.419354838709677	95.32	95.24	94.92	94.25	93.94	90.59
0.451612903225806	95.14	95.05	94.86	93.82	93.6	90.26
0.483870967741936	95.03	94.96	94.68	93.27	92.74	89.81
0.516129032258065	94.36	94.28	94.1	90.7	89.48	87.45
0.548387096774194	92.43	92.34	92.02	89.57	89.22	86.44
0.580645161290323	90.59	90.52	90.22	89.49	88.67	86.01
0.612903225806452	90.39	90.32	90.05	87.96	87.61	85.58
0.645161290322581	90.03	89.95	89.73	87.49	83.76	80.74
0.67741935483871	81.95	81.89	81.68	81.37	81.23	79.42
0.709677419354839	81.94	81.86	81.68	81.37	81.13	78.68
0.741935483870968	81.5	81.39	81.17	80.88	78.56	68.33
0.774193548387097	69.73	69.66	69.42	68.86	68.74	67.44
0.806451612903226	69.2	69.13	69.01	67.93	65.28	63.56

0.838709677419355			65.96	65.9	65.64	63.11	61.03	59.31
0.870967741935484			60.23	60.18	59.92	59.36	54.42	45.36
0.903225806451613			42.38	42.32	42.11	41.88	41.56	39.39
0.935483870967742			31.55	31.51	31.37	31.07	30.93	30.35
0.967741935483871			29.4	29.36	29.18	20.45	14.88	5.277
0.1	117	117	116.9	116	115.9	111.9		

Average of yearly averages: 83.0902333333333

Inputs generated by pe5.pl - Novemeber 2006

Data used for this run:
Output File: CALetAir
Metfile: w23273.dvf
PRZM scenario: CAlettuceSTD.txt
EXAMS environment file: pond298.exv
Chemical Name: Myclobutanil total

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	288.8	g/mol	
Henry's Law Const.	henry		atm-m^3/mol	
Vapor Pressure	vapr		torr	
Solubility	sol	142	mg/L	
Kd Kd	Kd	0.719	mg/L	
Koc Koc			mg/L	
Photolysis half-life	kdp		days	Half-life
Aerobic Aquatic Metabolism	kbacw	630	days	Halfife
Anaerobic Aquatic Metabolism	kbacs		days	Halfife
Aerobic Soil Metabolism	asm	315	days	Halfife
Hydrolysis: pH 7			days	Half-life
Method: CAM 2		integer	See PRZM manual	
Incorporation Depth:	DEPI		cm	
Application Rate:	TAPP	0.14	kg/ha	
Application Efficiency:		APPEFF	0.95	fraction
Spray Drift	DRFT	0.05	fraction of application rate applied to pond	
Application Date	Date	20-2	dd/mm or dd/mmm or dd-mm or dd-mmm	
Interval 1	interval	14	days	Set to 0 or delete line for single app.
app. rate 1	apprate	0.14	kg/ha	
Interval 2	interval	14	days	Set to 0 or delete line for single app.
app. rate 2	apprate	0.14	kg/ha	
Interval 3	interval	14	days	Set to 0 or delete line for single app.
app. rate 3	apprate	0.14	kg/ha	
Interval 4	interval	14	days	Set to 0 or delete line for single app.
app. rate 4	apprate	0.14	kg/ha	
Interval 5	interval	14	days	Set to 0 or delete line for single app.
app. rate 5	apprate	0.14	kg/ha	
Interval 6	interval	14	days	Set to 0 or delete line for single app.
app. rate 6	apprate	0.14	kg/ha	
Interval 7	interval	14	days	Set to 0 or delete line for single app.
app. rate 7	apprate	0.14	kg/ha	
Interval 8	interval	14	days	Set to 0 or delete line for single app.
app. rate 8	apprate	0.14	kg/ha	
Interval 9	interval	14	days	Set to 0 or delete line for single app.
app. rate 9	apprate	0.14	kg/ha	
Interval 10	interval	14	days	Set to 0 or delete line for single app.
app. rate 10	apprate	0.14	kg/ha	
Interval 11	interval	14	days	Set to 0 or delete line for single app.
app. rate 11	apprate	0.14	kg/ha	
Record 17:	FILTRA			
IPSCND				
UPTKF				
Record 18:	PLVKRT			
PLDKRT				
FEXTRC	0.5			
Flag for Index Res. Run		IR	EPA Pond	
Flag for runoff calc.	RUNOFF	none	none, monthly or total(average of entire run)	

CA lettuce ground spray myclobutanil plus 1,2,4-triazole ASM = 315 days, AAqM = 630 days, Kd = 0.719 mg/L

stored as CALetgrd.out
Chemical: Myclobutanil total
PRZM environment: CAlettuceSTD.txt modified Tueday, 21 February 2006 at 00:38:22
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 16:33:30

Metfile: w23273.dvf modified Wedday, 3 July 2002 at 09:04:22
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	27.58	27.54	27.36	18.25	12.42	3.393
1962	27.88	27.85	27.76	27.59	27.45	26.72
1963	36.17	36.12	35.96	35.77	35.65	33.8
1964	52.94	52.9	52.66	52.12	46.91	38
1965	57.42	57.37	57.14	54.5	52.24	50.84
1966	60.15	60.09	59.87	58.25	55.43	53.88
1967	59.43	59.37	59.14	58.72	58.52	56.76
1968	70.27	70.17	69.96	69.74	67.35	56.78
1969	70.57	70.5	70.24	69.67	69.22	67.56
1970	83.87	83.77	83.45	75.34	71.34	68.28
1971	83.34	83.29	82.99	82.26	81.68	79.73
1972	79.22	79.14	78.86	77.54	75.3	72.94
1973	77.62	77.56	77.3	76.7	76.51	73.58
1974	101	101	100	89.25	83.3	76.11
1975	100	100	99.8	98.98	99.05	94.74
1976	103	103	103	102	101	91.19
1977	103	103	103	102	101	97.12
1978	116	116	115	114	113	100
1979	111	111	111	110	110	105
1980	104	104	103	103	102	97.57
1981	101	101	101	101	101	96.91
1982	94.89	94.85	94.61	93.96	93.58	90.71
1983	87.08	87	86.7	86.09	85.98	83.37
1984	81.23	81.17	80.89	80.28	79.87	75.76
1985	75.6	75.54	75.34	73.72	73.38	70.61
1986	80.72	80.66	80.42	78.86	78.17	74.97
1987	80.12	80.07	79.91	79.38	79.45	77.06
1988	80.29	80.21	79.93	79.33	78.79	76.12
1989	75.83	75.78	75.55	75.03	74.65	70.62
1990	67.07	67.02	66.84	66.52	66.27	62.94

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly		
0.032258064516129			116	116	115	114	113	105
0.0645161290322581			111	111	111	110	110	100
0.0967741935483871			104	104	103	103	102	97.57
0.129032258064516			103	103	103	102	101	97.12
0.161290322580645			103	103	103	102	101	96.91
0.193548387096774			101	101	101	101	101	94.74
0.225806451612903			101	101	100	98.98	99.05	91.19
0.258064516129032			100	100	99.8	93.96	93.58	90.71
0.290322580645161			94.89	94.85	94.61	89.25	85.98	83.37
0.32258064516129			87.08	87	86.7	86.09	83.3	79.73
0.354838709677419			83.87	83.77	83.45	82.26	81.68	77.06
0.387096774193548			83.34	83.29	82.99	80.28	79.87	76.12
0.419354838709677			81.23	81.17	80.89	79.38	79.45	76.11
0.451612903225806			80.72	80.66	80.42	79.33	78.79	75.76
0.483870967741936			80.29	80.21	79.93	78.86	78.17	74.97
0.516129032258065			80.12	80.07	79.91	77.54	76.51	73.58
0.548387096774194			79.22	79.14	78.86	76.7	75.3	72.94
0.580645161290323			77.62	77.56	77.3	75.34	74.65	70.62
0.612903225806452			75.83	75.78	75.55	75.03	73.38	70.61
0.645161290322581			75.6	75.54	75.34	73.72	71.34	68.28
0.67741935483871			70.57	70.5	70.24	69.74	69.22	67.56
0.709677419354839			70.27	70.17	69.96	69.67	67.35	62.94
0.741935483870968			67.07	67.02	66.84	66.52	66.27	56.78
0.774193548387097			60.15	60.09	59.87	58.72	58.52	56.76
0.806451612903226			59.43	59.37	59.14	58.25	55.43	53.88
0.838709677419355			57.42	57.37	57.14	54.5	52.24	50.84
0.870967741935484			52.94	52.9	52.66	52.12	46.91	38
0.903225806451613			36.17	36.12	35.96	35.77	35.65	33.8
0.935483870967742			27.88	27.85	27.76	27.59	27.45	26.72
0.967741935483871			27.58	27.54	27.36	18.25	12.42	3.393
0.1	103.9	103.9	103	102.9	101.9	97.525		

Average of yearly averages: 70.7687666666667

Inputs generated by pe5.pl - Novemeber 2006

Data used for this run:
Output File: CALetgrd
Metfile: w23273.dvf

PRZM scenario: CAlettuceSTD.txt
EXAMS environment file: pond298.exv
Chemical Name: Myclobutanil total

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	288.8	g/mol	
Henry's Law Const.	henry		atm-m^3/mol	
Vapor Pressure vapr			torr	
Solubility	sol	142	mg/L	
Kd Kd	0.719	mg/L		
Koc Koc		mg/L		
Photolysis half-life	kdp		days	Half-life
Aerobic Aquatic Metabolism	kbacw	630	days	Halfife
Anaerobic Aquatic Metabolism	kbacs		days	Halfife
Aerobic Soil Metabolism	asm	315	days	Halfife
Hydrolysis: pH 7			days	Half-life
Method: CAM	2	integer	See PRZM manual	
Incorporation Depth:	DEPI		cm	
Application Rate:	TAPP	0.14	kg/ha	
Application Efficiency:		APPEFF	0.99	fraction
Spray Drift	DRFT	0.01	fraction of application rate applied to pond	
Application Date	Date	20-2	dd/mm or dd/mmm or dd-mm or dd-mmm	
Interval 1	interval	14	days	Set to 0 or delete line for single app.
app. rate 1	apprate	0.14	kg/ha	
Interval 2	interval	14	days	Set to 0 or delete line for single app.
app. rate 2	apprate	0.14	kg/ha	
Interval 3	interval	14	days	Set to 0 or delete line for single app.
app. rate 3	apprate	0.14	kg/ha	
Interval 4	interval	14	days	Set to 0 or delete line for single app.
app. rate 4	apprate	0.14	kg/ha	
Interval 5	interval	14	days	Set to 0 or delete line for single app.
app. rate 5	apprate	0.14	kg/ha	
Interval 6	interval	14	days	Set to 0 or delete line for single app.
app. rate 6	apprate	0.14	kg/ha	
Interval 7	interval	14	days	Set to 0 or delete line for single app.
app. rate 7	apprate	0.14	kg/ha	
Interval 8	interval	14	days	Set to 0 or delete line for single app.
app. rate 8	apprate	0.14	kg/ha	
Interval 9	interval	14	days	Set to 0 or delete line for single app.
app. rate 9	apprate	0.14	kg/ha	
Interval 10	interval	14	days	Set to 0 or delete line for single app.
app. rate 10	apprate	0.14	kg/ha	
Interval 11	interval	14	days	Set to 0 or delete line for single app.
app. rate 11	apprate	0.14	kg/ha	
Record 17:	FILTRA			
IPSCND				
UPTKF				
Record 18:	PLVKRT			
PLDKRT				
FEXTRC	0.5			
Flag for Index Res. Run		IR	EPA Pond	
Flag for runoff calc.	RUNOFF	none	none, monthly or total(average of entire run)	

CA Okra aerial spray myclobutanil plus 1,2,4-triazole ASM = 315 days, AAqM = 630 days, Kd = 0.719 mg/L

stored as CAORKAIR.out
Chemical: Myclobutanil total
PRZM environment: CAtomato_WirrigSTD.txt modified Monday, 28 May 2007 at 22:43:54
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 16:33:30
Metfile: w23155.dvf modified Wedday, 3 July 2002 at 09:04:20
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	1.403	1.401	1.391	1.358	1.329	0.8911
1962	3.012	3.007	2.986	2.928	2.874	2.342
1963	5.017	5.008	4.97	4.879	4.811	4.129
1964	5.331	5.323	5.288	5.195	5.121	4.566
1965	5.709	5.699	5.658	5.557	5.486	4.9
1966	6.228	6.216	6.166	6.047	5.966	5.441
1967	7.135	7.121	7.067	6.944	6.854	6.092
1968	7.188	7.178	7.125	6.995	6.887	6.225
1969	7.267	7.253	7.189	7.056	6.955	6.258
1970	7.15	7.142	7.114	6.898	6.791	6.246

1971	8.413	8.399	8.323	8.169	8.079	7.333
1972	9.119	9.098	8.997	8.749	8.564	7.64
1973	8.571	8.552	8.472	8.316	8.195	7.493
1974	8.201	8.187	8.126	8.103	8.101	7.306
1975	9.086	9.07	8.995	8.842	8.716	7.961
1976	8.573	8.554	8.477	8.318	8.201	7.475
1977	7.904	7.891	7.841	7.712	7.596	7.142
1978	7.938	7.922	7.857	7.718	7.606	6.942
1979	7.442	7.426	7.36	7.219	7.107	6.439
1980	7.237	7.225	7.176	7.056	6.959	6.267
1981	7.085	7.075	7.018	6.885	6.773	6.199
1982	7.424	7.408	7.34	7.201	7.103	6.377
1983	7.331	7.309	7.223	7.054	6.957	6.585
1984	7.727	7.712	7.648	7.515	7.413	6.758
1985	7.377	7.366	7.317	7.218	7.131	6.568
1986	7.482	7.469	7.411	7.282	7.181	6.569
1987	7.835	7.82	7.757	7.625	7.522	7.069
1988	8.487	8.473	8.414	8.281	8.17	7.44
1989	7.859	7.848	7.823	7.699	7.601	6.945
1990	7.43	7.418	7.366	7.242	7.144	6.501

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly		
0.032258064516129			9.119	9.098	8.997	8.842	8.716	7.961
0.0645161290322581			9.086	9.07	8.995	8.749	8.564	7.64
0.0967741935483871			8.573	8.554	8.477	8.318	8.201	7.493
0.129032258064516			8.571	8.552	8.472	8.316	8.195	7.475
0.161290322580645			8.487	8.473	8.414	8.281	8.17	7.44
0.193548387096774			8.413	8.399	8.323	8.169	8.101	7.333
0.225806451612903			8.201	8.187	8.126	8.103	8.079	7.306
0.258064516129032			7.938	7.922	7.857	7.718	7.606	7.142
0.290322580645161			7.904	7.891	7.841	7.712	7.601	7.069
0.32258064516129			7.859	7.848	7.823	7.699	7.596	6.945
0.354838709677419			7.835	7.82	7.757	7.625	7.522	6.942
0.387096774193548			7.727	7.712	7.648	7.515	7.413	6.758
0.419354838709677			7.482	7.469	7.411	7.282	7.181	6.585
0.451612903225806			7.442	7.426	7.366	7.242	7.144	6.569
0.483870967741936			7.43	7.418	7.36	7.219	7.131	6.568
0.516129032258065			7.424	7.408	7.34	7.218	7.107	6.501
0.548387096774194			7.377	7.366	7.317	7.201	7.103	6.439
0.580645161290323			7.331	7.309	7.223	7.056	6.959	6.377
0.612903225806452			7.267	7.253	7.189	7.056	6.957	6.267
0.645161290322581			7.237	7.225	7.176	7.054	6.955	6.258
0.67741935483871			7.188	7.178	7.125	6.995	6.887	6.246
0.709677419354839			7.15	7.142	7.114	6.944	6.854	6.225
0.741935483870968			7.135	7.121	7.067	6.898	6.791	6.199
0.774193548387097			7.085	7.075	7.018	6.885	6.773	6.092
0.806451612903226			6.228	6.216	6.166	6.047	5.966	5.441
0.838709677419355			5.709	5.699	5.658	5.557	5.486	4.9
0.870967741935484			5.331	5.323	5.288	5.195	5.121	4.566
0.903225806451613			5.017	5.008	4.97	4.879	4.811	4.129
0.935483870967742			3.012	3.007	2.986	2.928	2.874	2.342
0.967741935483871			1.403	1.401	1.391	1.358	1.329	0.8911
0.1	8.5728	8.5538	8.4765	8.3178	8.2004	7.4912		

Average of yearly averages: 6.20330333333333

Inputs generated by pe5.pl - Novemeber 2006

Data used for this run:
Output File: CAORKAIR
Metfile: w23155.dvf
PRZM scenario: CAtomato_WirrigSTD.txt
EXAMS environment file: pond298.exv
Chemical Name: Myclobutanil total

Description	Variable Name	Value	Units	Comments	
Molecular weight	mwt	288.8	g/mol		
Henry's Law Const.	henry		atm-m^3/mol		
Vapor Pressure	vapr		torr		
Solubility	sol	142	mg/L		
Kd Kd	0.719	mg/L			
Koc Koc		mg/L			
Photolysis half-life	kdp		days	Half-life	
Aerobic Aquatic Metabolism	kbacw	630	days	Halfife	
Anaerobic Aquatic Metabolism	kbacs		days	Halfife	
Aerobic Soil Metabolism	asm	315	days	Halfife	

```
Hydrolysis:     pH 7            days    Half-life
Method: CAM     2       integer See PRZM manual
Incorporation Depth:    DEPI            cm
Application Rate:       TAPP    0.14    kg/ha
Application Efficiency:         APPEFF  0.95    fraction
Spray Drift     DRFT    0.05    fraction of application rate applied to pond
Application Date        Date    1-4     dd/mm or dd/mmm or dd-mm or dd-mmm
Interval 1      interval        10      days    Set to 0 or delete line for single app.
app. rate 1     apprate 0.14    kg/ha
Interval 2      interval        10      days    Set to 0 or delete line for single app.
app. rate 2     apprate 0.14    kg/ha
Interval 3      interval        10      days    Set to 0 or delete line for single app.
app. rate 3     apprate 0.14    kg/ha
Record 17:      FILTRA
        IPSCND
        UPTKF
Record 18:      PLVKRT
        PLDKRT
        FEXTRC  0.5
Flag for Index Res. Run         IR      EPA Pond
Flag for runoff calc.   RUNOFF  none    none, monthly or total(average of entire run)
```

CA Okra ground spray myclobutanil plus 1,2,4-triazole ASM = 315 days, AAqM = 630 days, Kd = 0.719 mg/L

```
stored as CAORKGRD.out
Chemical: Myclobutanil total
PRZM environment: CAtomato_WirrigSTD.txt      modified Monday, 28 May 2007 at 22:43:54
EXAMS environment: pond298.exv        modified Thuday, 29 August 2002 at 16:33:30
Metfile: w23155.dvf     modified Wedday, 3 July 2002 at 09:04:20
Water segment concentrations (ppb)
```

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	0.452	0.4515	0.4496	0.3712	0.3296	0.2115
1962	1.128	1.126	1.12	1.099	1.084	0.9209
1963	2.55	2.546	2.528	2.494	2.469	2.156
1964	2.348	2.345	2.333	2.303	2.277	2.127
1965	2.418	2.363	2.348	2.316	2.292	2.112
1966	2.737	2.735	2.726	2.545	2.519	2.406
1967	3.312	3.306	3.282	3.24	3.196	2.893
1968	3.298	3.296	3.274	3.234	3.202	2.951
1969	3.27	3.265	3.237	3.2	3.166	2.904
1970	4.063	4.057	4.038	3.414	3.108	2.886
1971	4.53	4.522	4.48	4.371	4.288	3.976
1972	5.274	5.264	5.204	5.058	4.949	4.237
1973	4.474	4.465	4.435	4.395	4.366	4.054
1974	5	4.996	4.978	4.942	4.918	3.87
1975	5.027	5.02	4.988	4.933	4.888	4.548
1976	4.504	4.494	4.455	4.362	4.309	4.023
1977	4.064	4.052	4.002	3.908	3.852	3.681
1978	3.865	3.858	3.829	3.79	3.751	3.517
1979	3.347	3.34	3.312	3.273	3.239	3.001
1980	3.158	3.153	3.132	3.085	3.041	2.797
1981	2.935	2.933	2.912	2.873	2.841	2.713
1982	3.312	3.306	3.278	3.239	3.207	2.913
1983	3.696	3.684	3.64	3.552	3.502	3.065
1984	3.524	3.517	3.49	3.449	3.418	3.199
1985	3.146	3.138	3.108	3.096	3.074	2.949
1986	3.172	3.167	3.144	3.107	3.076	2.889
1987	4.044	4.04	4.026	3.95	3.609	3.368
1988	4.158	4.151	4.124	4.078	4.031	3.75
1989	3.558	3.554	3.532	3.494	3.462	3.235
1990	3.042	3.038	3.019	2.983	2.956	2.753

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly	
0.032258064516129		5.274	5.264	5.204	5.058	4.949	4.548
0.0645161290322581		5.027	5.02	4.988	4.942	4.918	4.237
0.0967741935483871		5	4.996	4.978	4.933	4.888	4.054
0.129032258064516		4.53	4.522	4.48	4.395	4.366	4.023
0.161290322580645		4.504	4.494	4.455	4.371	4.309	3.976
0.193548387096774		4.474	4.465	4.435	4.362	4.288	3.87

0.225806451612903	4.158	4.151	4.124	4.078	4.031	3.75
0.258064516129032	4.064	4.057	4.038	3.95	3.852	3.681
0.290322580645161	4.063	4.052	4.026	3.908	3.751	3.517
0.32258064516129	4.044	4.04	4.002	3.79	3.609	3.368
0.354838709677419	3.865	3.858	3.829	3.552	3.502	3.235
0.387096774193548	3.696	3.684	3.64	3.494	3.462	3.199
0.419354838709677	3.558	3.554	3.532	3.449	3.418	3.065
0.451612903225806	3.524	3.517	3.49	3.414	3.239	3.001
0.483870967741936	3.347	3.34	3.312	3.273	3.207	2.951
0.516129032258065	3.312	3.306	3.282	3.24	3.202	2.949
0.548387096774194	3.312	3.306	3.278	3.239	3.196	2.913
0.580645161290323	3.298	3.296	3.274	3.234	3.166	2.904
0.612903225806452	3.27	3.265	3.237	3.2	3.108	2.893
0.645161290322581	3.172	3.167	3.144	3.107	3.076	2.889
0.67741935483871	3.158	3.153	3.132	3.096	3.074	2.886
0.709677419354839	3.146	3.138	3.108	3.085	3.041	2.797
0.741935483870968	3.042	3.038	3.019	2.983	2.956	2.753
0.774193548387097	2.935	2.933	2.912	2.873	2.841	2.713
0.806451612903226	2.737	2.735	2.726	2.545	2.519	2.406
0.838709677419355	2.55	2.546	2.528	2.494	2.469	2.156
0.870967741935484	2.418	2.363	2.348	2.316	2.292	2.127
0.903225806451613	2.348	2.345	2.333	2.303	2.277	2.112
0.935483870967742	1.128	1.126	1.12	1.099	1.084	0.9209
0.967741935483871	0.452	0.4515	0.4496	0.3712	0.3296	0.2115

0.1	4.953	4.9486	4.9282	4.8792	4.8358	4.0509

Average of yearly averages: 3.00351333333333

Inputs generated by pe5.pl - Novemeber 2006

Data used for this run:
Output File: CAORKGRD
Metfile: w23155.dvf
PRZM scenario: CAtomato_WirrigSTD.txt
EXAMS environment file: pond298.exv
Chemical Name: Myclobutanil total

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	288.8	g/mol	
Henry's Law Const.	henry		atm-m^3/mol	
Vapor Pressure vapr		torr		
Solubility	sol	142	mg/L	
Kd Kd	0.719	mg/L		
Koc Koc		mg/L		
Photolysis half-life	kdp		days	Half-life
Aerobic Aquatic Metabolism	kbacw	630	days	Halfife
Anaerobic Aquatic Metabolism	kbacs		days	Halfife
Aerobic Soil Metabolism	asm	315	days	Halfife
Hydrolysis: pH 7		days	Half-life	
Method: CAM 2	integer	See PRZM manual		
Incorporation Depth:	DEPI		cm	
Application Rate:	TAPP	0.14	kg/ha	
Application Efficiency:	APPEFF	0.99	fraction	
Spray Drift DRFT	0.01	fraction of application rate applied to pond		
Application Date	Date	1-4	dd/mm or dd/mmm or dd-mm or dd-mmm	
Interval 1	interval	10	days	Set to 0 or delete line for single app.
app. rate 1	apprate	0.14	kg/ha	
Interval 2	interval	10	days	Set to 0 or delete line for single app.
app. rate 2	apprate	0.14	kg/ha	
Interval 3	interval	10	days	Set to 0 or delete line for single app.
app. rate 3	apprate	0.14	kg/ha	
Record 17:	FILTRA			
IPSCND				
UPTKF				
Record 18:	PLVKRT			
PLDKRT				
FEXTRC	0.5			
Flag for Index Res. Run	IR	EPA Pond		
Flag for runoff calc.	RUNOFF	none	none, monthly or total(average of entire run)	

FL Okra aerial spray myclobutanil plus 1,2,4-triazole ASM = 315 days, AAqM = 630 days, Kd = 0.719 mg/L

stored as FLORKAIR.out
Chemical: Myclobutanil total

PRZM environment: FLtomatoSTD.txt modified Monday, 28 May 2007 at 22:54:10
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 16:33:30
Metfile: w12844.dvf modified Wedday, 3 July 2002 at 09:04:30
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	3.589	3.58	3.56	3.498	3.438	2.52
1962	6.323	6.31	6.257	6.127	6.023	4.918
1963	6.787	6.775	6.713	6.56	6.452	5.83
1964	9.043	9.024	8.952	8.846	8.767	7.582
1965	10.38	10.36	10.28	10.11	9.971	8.585
1966	14.76	14.73	14.61	14.34	14.14	11.95
1967	15.55	15.52	15.39	15.07	14.96	13.15
1968	14.47	14.45	14.41	14.26	14.1	12.47
1969	14.62	14.59	14.5	14.25	14.05	12.34
1970	19.18	19.14	19.03	18.67	18.36	15.4
1971	14.68	14.66	14.57	14.42	14.3	12.89
1972	12.67	12.65	12.55	12.38	12.27	10.96
1973	10.91	10.88	10.79	10.7	10.61	9.446
1974	14.28	14.24	14.11	13.86	13.64	11.37
1975	11.21	11.19	11.11	10.95	10.84	9.746
1976	13.49	13.46	13.34	13.08	12.89	11.04
1977	10.89	10.87	10.78	10.64	10.62	9.707
1978	10.07	10.06	10.02	9.859	9.717	8.619
1979	9.358	9.339	9.254	9.053	8.89	8.04
1980	10.2	10.18	10.09	9.949	9.834	8.52
1981	10.2	10.18	10.11	9.915	9.759	8.524
1982	14.44	14.41	14.28	14.01	13.79	11.43
1983	14.84	14.82	14.71	14.54	14.37	12.48
1984	15.71	15.68	15.57	15.36	15.17	13.34
1985	17.29	17.26	17.11	16.87	16.61	14.2
1986	17.26	17.23	17.16	16.87	16.62	14.47
1987	16.47	16.44	16.38	16.13	15.9	13.84
1988	15.12	15.09	14.99	14.79	14.59	12.85
1989	12.75	12.72	12.66	12.52	12.39	11.02
1990	12.54	12.52	12.41	12.24	12.08	10.47

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129		19.18	19.14	19.03	18.67	18.36	15.4
0.0645161290322581		17.29	17.26	17.16	16.87	16.62	14.47
0.0967741935483871		17.26	17.23	17.11	16.87	16.61	14.2
0.129032258064516		16.47	16.44	16.38	16.13	15.9	13.84
0.161290322580645		15.71	15.68	15.57	15.36	15.17	13.34
0.193548387096774		15.55	15.52	15.39	15.07	14.96	13.15
0.225806451612903		15.12	15.09	14.99	14.79	14.59	12.89
0.258064516129032		14.84	14.82	14.71	14.54	14.37	12.85
0.290322580645161		14.76	14.73	14.61	14.42	14.3	12.48
0.32258064516129		14.68	14.66	14.57	14.34	14.14	12.47
0.354838709677419		14.62	14.59	14.5	14.26	14.1	12.34
0.387096774193548		14.47	14.45	14.41	14.25	14.05	11.95
0.419354838709677		14.44	14.41	14.28	14.01	13.79	11.43
0.451612903225806		14.28	14.24	14.11	13.86	13.64	11.37
0.483870967741936		13.49	13.46	13.34	13.08	12.89	11.04
0.516129032258065		12.75	12.72	12.66	12.52	12.39	11.02
0.548387096774194		12.67	12.65	12.55	12.38	12.27	10.96
0.580645161290323		12.54	12.52	12.41	12.24	12.08	10.47
0.612903225806452		11.21	11.19	11.11	10.95	10.84	9.746
0.645161290322581		10.91	10.88	10.79	10.7	10.62	9.707
0.67741935483871		10.89	10.87	10.78	10.64	10.61	9.446
0.709677419354839		10.38	10.36	10.28	10.11	9.971	8.619
0.741935483870968		10.2	10.18	10.11	9.949	9.834	8.585
0.774193548387097		10.2	10.18	10.09	9.915	9.759	8.524
0.806451612903226		10.07	10.06	10.02	9.859	9.717	8.52
0.838709677419355		9.358	9.339	9.254	9.053	8.89	8.04
0.870967741935484		9.043	9.024	8.952	8.846	8.767	7.582
0.903225806451613		6.787	6.775	6.713	6.56	6.452	5.83
0.935483870967742		6.323	6.31	6.257	6.127	6.023	4.918
0.967741935483871		3.589	3.58	3.56	3.498	3.438	2.52

0.1	17.181	17.151	17.037	16.796	16.539	14.164

Average of yearly averages: 10.5902333333333

Inputs generated by pe5.pl - Novemeber 2006

Data used for this run:

Output File: FLORKAIR
Metfile: w12844.dvf
PRZM scenario: FLtomatoSTD.txt
EXAMS environment file: pond298.exv
Chemical Name: Myclobutanil total

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	288.8	g/mol	
Henry's Law Const.	henry		atm-m^3/mol	
Vapor Pressure	vapr		torr	
Solubility	sol	142	mg/L	
Kd Kd	0.719	mg/L		
Koc Koc		mg/L		
Photolysis half-life	kdp		days	Half-life
Aerobic Aquatic Metabolism	kbacw	630	days	Halfife
Anaerobic Aquatic Metabolism	kbacs		days	Halfife
Aerobic Soil Metabolism	asm	315	days	Halfife
Hydrolysis: pH 7			days	Half-life
Method: CAM 2	integer	See PRZM manual		
Incorporation Depth:	DEPI		cm	
Application Rate:	TAPP	0.14	kg/ha	
Application Efficiency:	APPEFF	0.95	fraction	
Spray Drift DRFT	0.05	fraction of application rate applied to pond		
Application Date	Date	1-2	dd/mm or dd/mmm or dd-mm or dd-mmm	
Interval 1	interval	10	days	Set to 0 or delete line for single app.
app. rate 1	apprate	0.14	kg/ha	
Interval 2	interval	10	days	Set to 0 or delete line for single app.
app. rate 2	apprate	0.14	kg/ha	
Interval 3	interval	10	days	Set to 0 or delete line for single app.
app. rate 3	apprate	0.14	kg/ha	
Record 17: FILTRA				
IPSCND				
UPTKF				
Record 18: PLVKRT				
PLDKRT				
FEXTRC 0.5				
Flag for Index Res. Run	IR	EPA Pond		
Flag for runoff calc. RUNOFF	none	none, monthly or total(average of entire run)		

FL Okra ground spray myclobutanil plus 1,2,4-triazole ASM = 315 days, AAqM = 630 days, Kd = 0.719 mg/L

stored as FLORKGRD.out
Chemical: Myclobutanil total
PRZM environment: FLtomatoSTD.txt modified Monday, 28 May 2007 at 22:54:10
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 16:33:30
Metfile: w12844.dvf modified Wedday, 3 July 2002 at 09:04:30
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	2.625	2.618	2.594	2.552	2.509	1.776
1962	4.704	4.694	4.655	4.559	4.48	3.586
1963	4.736	4.726	4.684	4.577	4.49	4.046
1964	6.543	6.529	6.503	6.445	6.399	5.529
1965	7.688	7.672	7.64	7.512	7.4	6.348
1966	12.09	12.07	11.97	11.75	11.56	9.678
1967	12.81	12.79	12.68	12.42	12.26	10.8
1968	11.51	11.49	11.44	11.37	11.23	9.961
1969	11.54	11.52	11.45	11.25	11.08	9.735
1970	16.25	16.21	16.11	15.81	15.54	12.89
1971	11.73	11.71	11.65	11.56	11.51	10.27
1972	9.573	9.557	9.487	9.308	9.228	8.309
1973	7.767	7.751	7.686	7.579	7.539	6.772
1974	11.25	11.23	11.12	10.93	10.76	8.788
1975	8.167	8.153	8.094	8.027	7.994	7.084
1976	10.36	10.34	10.24	10.04	9.885	8.384
1977	7.685	7.669	7.602	7.508	7.497	6.958
1978	6.729	6.718	6.688	6.587	6.493	5.806
1979	6.152	6.139	6.083	5.949	5.841	5.203
1980	6.831	6.818	6.769	6.682	6.611	5.697
1981	6.864	6.851	6.803	6.671	6.568	5.707
1982	11.32	11.29	11.18	10.96	10.79	8.774
1983	11.78	11.76	11.68	11.52	11.39	9.88
1984	12.7	12.68	12.59	12.4	12.24	10.75
1985	14.32	14.29	14.16	13.98	13.77	11.64

1986	14.26	14.24	14.19	13.96	13.75	11.94
1987	13.46	13.44	13.39	13.2	13.01	11.3
1988	12.07	12.05	11.97	11.8	11.65	10.28
1989	9.603	9.586	9.538	9.456	9.375	8.407
1990	9.417	9.397	9.358	9.212	9.085	7.866

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly		
0.032258064516129			16.25	16.21	16.11	15.81	15.54	12.89
0.0645161290322581			14.32	14.29	14.19	13.98	13.77	11.94
0.0967741935483871			14.26	14.24	14.16	13.96	13.75	11.64
0.129032258064516			13.46	13.44	13.39	13.2	13.01	11.3
0.161290322580645			12.81	12.79	12.68	12.42	12.26	10.8
0.193548387096774			12.7	12.68	12.59	12.4	12.24	10.75
0.225806451612903			12.09	12.07	11.97	11.8	11.65	10.28
0.258064516129032			12.07	12.05	11.97	11.75	11.56	10.27
0.290322580645161			11.78	11.76	11.68	11.56	11.51	9.961
0.32258064516129			11.73	11.71	11.65	11.52	11.39	9.88
0.354838709677419			11.54	11.52	11.45	11.37	11.23	9.735
0.387096774193548			11.51	11.49	11.44	11.25	11.08	9.678
0.419354838709677			11.32	11.29	11.18	10.96	10.79	8.788
0.451612903225806			11.25	11.23	11.12	10.93	10.76	8.774
0.483870967741936			10.36	10.34	10.24	10.04	9.885	8.407
0.516129032258065			9.603	9.586	9.538	9.456	9.375	8.384
0.548387096774194			9.573	9.557	9.487	9.308	9.228	8.309
0.580645161290323			9.417	9.397	9.358	9.212	9.085	7.866
0.612903225806452			8.167	8.153	8.094	8.027	7.994	7.084
0.645161290322581			7.767	7.751	7.686	7.579	7.539	6.958
0.67741935483871			7.688	7.672	7.64	7.512	7.497	6.772
0.709677419354839			7.685	7.669	7.602	7.508	7.4	6.348
0.741935483870968			6.864	6.851	6.803	6.682	6.611	5.806
0.774193548387097			6.831	6.818	6.769	6.671	6.568	5.707
0.806451612903226			6.729	6.718	6.688	6.587	6.493	5.697
0.838709677419355			6.543	6.529	6.503	6.445	6.399	5.529
0.870967741935484			6.152	6.139	6.083	5.949	5.841	5.203
0.903225806451613			4.736	4.726	4.684	4.577	4.49	4.046
0.935483870967742			4.704	4.694	4.655	4.559	4.48	3.586
0.967741935483871			2.625	2.618	2.594	2.552	2.509	1.776
0.1	14.18	14.16	14.083	13.884	13.676	11.606		

Average of yearly averages: 8.1388

Inputs generated by pe5.pl - Novemeber 2006

Data used for this run:
Output File: FLORKGRD
Metfile: w12844.dvf
PRZM scenario: FLtomatoSTD.txt
EXAMS environment file: pond298.exv
Chemical Name: Myclobutanil total

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	288.8	g/mol	
Henry's Law Const.	henry		atm-m^3/mol	
Vapor Pressure	vapr		torr	
Solubility	sol	142	mg/L	
Kd Kd	0.719	mg/L		
Koc Koc		mg/L		
Photolysis half-life	kdp		days	Half-life
Aerobic Aquatic Metabolism	kbacw	630	days	Halfife
Anaerobic Aquatic Metabolism	kbacs		days	Halfife
Aerobic Soil Metabolism	asm	315	days	Halfife
Hydrolysis: pH 7		days	Half-life	
Method: CAM 2	integer	See PRZM manual		
Incorporation Depth:	DEPI		cm	
Application Rate:	TAPP	0.14	kg/ha	
Application Efficiency:	APPEFF	0.99	fraction	
Spray Drift DRFT	0.01	fraction of application rate applied to pond		
Application Date	Date	1-2	dd/mm or dd/mmm or dd-mm or dd-mmm	
Interval 1	interval	10	days	Set to 0 or delete line for single app.
app. rate 1	apprate	0.14	kg/ha	
Interval 2	interval	10	days	Set to 0 or delete line for single app.
app. rate 2	apprate	0.14	kg/ha	
Interval 3	interval	10	days	Set to 0 or delete line for single app.
app. rate 3	apprate	0.14	kg/ha	
Record 17:	FILTRA			
IPSCND				

```
       UPTKF
Record 18:     PLVKRT
       PLDKRT
       FEXTRC  0.5
Flag for Index Res. Run       IR      EPA Pond
Flag for runoff calc.  RUNOFF  none    none, monthly or total(average of entire run)
```

CA Tropical Fruit aerial spray myclobutanil plus 1,2,4-triazole ASM = 315 days, AAqM = 630 days, Kd = 0.719 mg/L

stored as CATFAIR.out
Chemical: Myclobutanil total
PRZM environment: CAcitrus_WirrigSTD.txt modified Monday, 28 May 2007 at 22:41:26
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 16:33:30
Metfile: w23155.dvf modified Wedday, 3 July 2002 at 09:04:20
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	5.408	5.398	5.357	5.264	5.174	4.156
1962	12.58	12.56	12.47	12.27	12.14	10.38
1963	21.96	21.93	21.81	21.54	21.32	18.46
1964	22.36	22.33	22.21	21.96	21.76	19.8
1965	23.64	23.61	23.47	23.19	22.97	20.8
1966	24.49	24.45	24.28	24	23.79	21.64
1967	25.1	25.07	24.97	24.67	24.44	22.14
1968	24.51	24.47	24.32	24.02	23.79	21.55
1969	24.27	24.24	24.1	23.78	23.54	21.24
1970	23.8	23.77	23.65	23.36	23.14	21.11
1971	25.76	25.72	25.58	25.31	25.16	22.99
1972	25.77	25.7	25.43	24.75	24.67	23.12
1973	26.98	26.94	26.78	26.46	26.22	23.68
1974	28.07	28.03	27.87	27.56	27.34	24.51
1975	27.32	27.29	27.2	26.9	26.67	24.21
1976	26.25	26.21	26.09	25.79	25.56	23.19
1977	26.44	26.4	26.22	25.95	25.68	23.29
1978	33.1	33.05	32.87	32.55	32.29	28.54
1979	29.9	29.86	29.69	29.37	29.13	26.43
1980	27.45	27.41	27.28	27.08	26.88	24.62
1981	26.94	26.9	26.74	26.44	26.18	23.68
1982	26.06	26.02	25.87	25.51	25.21	22.82
1983	26.45	26.42	26.3	26.02	25.81	23.67
1984	25.94	25.91	25.79	25.5	25.28	23.02
1985	25.04	25	24.84	24.56	24.36	22.28
1986	24.81	24.78	24.64	24.37	24.16	22.06
1987	25.4	25.36	25.19	24.9	24.68	22.69
1988	25.62	25.59	25.5	25.25	25.04	22.8
1989	25.48	25.44	25.26	24.99	24.79	22.6
1990	24.83	24.79	24.63	24.36	24.16	21.99

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	33.1	33.05	32.87	32.55	32.29	28.54
0.0645161290322581	29.9	29.86	29.69	29.37	29.13	26.43
0.0967741935483871	28.07	28.03	27.87	27.56	27.34	24.62
0.129032258064516	27.45	27.41	27.28	27.08	26.88	24.51
0.161290322580645	27.32	27.29	27.2	26.9	26.67	24.21
0.193548387096774	26.98	26.94	26.78	26.46	26.22	23.68
0.225806451612903	26.94	26.9	26.74	26.44	26.18	23.68
0.258064516129032	26.45	26.42	26.3	26.02	25.81	23.67
0.290322580645161	26.44	26.4	26.22	25.95	25.68	23.29
0.32258064516129	26.25	26.21	26.09	25.79	25.56	23.19
0.354838709677419	26.06	26.02	25.87	25.51	25.28	23.12
0.387096774193548	25.94	25.91	25.79	25.5	25.21	23.02
0.419354838709677	25.77	25.72	25.58	25.31	25.16	22.99
0.451612903225806	25.76	25.7	25.5	25.25	25.04	22.82
0.483870967741936	25.62	25.59	25.43	24.99	24.79	22.8
0.516129032258065	25.48	25.44	25.26	24.9	24.68	22.69
0.548387096774194	25.4	25.36	25.19	24.75	24.67	22.6
0.580645161290323	25.1	25.07	24.97	24.67	24.44	22.28
0.612903225806452	25.04	25	24.84	24.56	24.36	22.14
0.645161290322581	24.83	24.79	24.64	24.37	24.16	22.06
0.67741935483871	24.81	24.78	24.63	24.36	24.16	21.99
0.709677419354839	24.51	24.47	24.32	24.02	23.79	21.64

0.741935483870968	24.49	24.45	24.28	24	23.79	21.55
0.774193548387097	24.27	24.24	24.1	23.78	23.54	21.24
0.806451612903226	23.8	23.77	23.65	23.36	23.14	21.11
0.838709677419355	23.64	23.61	23.47	23.19	22.97	20.8
0.870967741935484	22.36	22.33	22.21	21.96	21.76	19.8
0.903225806451613	21.96	21.93	21.81	21.54	21.32	18.46
0.935483870967742	12.58	12.56	12.47	12.27	12.14	10.38
0.967741935483871	5.408	5.398	5.357	5.264	5.174	4.156

0.1 28.008 27.968 27.811 27.512 27.294 24.609
Average of yearly averages: 21.7822

Inputs generated by pe5.pl - Novemeber 2006

Data used for this run:
Output File: CATFAIR
Metfile: w23155.dvf
PRZM scenario: CAcitrus_WirrigSTD.txt
EXAMS environment file: pond298.exv
Chemical Name: Myclobutanil total

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	288.8	g/mol	
Henry's Law Const.	henry		atm-m^3/mol	
Vapor Pressure	vapr		torr	
Solubility	sol	142	mg/L	
Kd Kd	0.719	mg/L		
Koc Koc		mg/L		
Photolysis half-life	kdp		days	Half-life
Aerobic Aquatic Metabolism	kbacw	630	days	Halfife
Anaerobic Aquatic Metabolism	kbacs		days	Halfife
Aerobic Soil Metabolism	asm	315	days	Halfife
Hydrolysis: pH 7		days	Half-life	
Method: CAM 2	integer	See PRZM manual		
Incorporation Depth:	DEPI		cm	
Application Rate:	TAPP	0.28	kg/ha	
Application Efficiency:	APPEFF	0.95	fraction	
Spray Drift	DRFT	0.05	fraction of application rate applied to pond	
Application Date	Date	1-1	dd/mm or dd/mmm or dd-mm or dd-mmm	
Interval 1	interval	14	days	Set to 0 or delete line for single app.
app. rate 1	apprate	0.28	kg/ha	
Interval 2	interval	14	days	Set to 0 or delete line for single app.
app. rate 2	apprate	0.28	kg/ha	
Interval 3	interval	14	days	Set to 0 or delete line for single app.
app. rate 3	apprate	0.28	kg/ha	
Interval 4	interval	14	days	Set to 0 or delete line for single app.
app. rate 4	apprate	0.28	kg/ha	
Interval 5	interval	14	days	Set to 0 or delete line for single app.
app. rate 5	apprate	0.28	kg/ha	
Interval 6	interval	14	days	Set to 0 or delete line for single app.
app. rate 6	apprate	0.28	kg/ha	
Interval 7	interval	14	days	Set to 0 or delete line for single app.
app. rate 7	apprate	0.28	kg/ha	
Record 17:	FILTRA			
IPSCND				
UPTKF				
Record 18:	PLVKRT			
PLDKRT				
FEXTRC	0.5			
Flag for Index Res. Run	IR	EPA Pond		
Flag for runoff calc.	RUNOFF	none	none, monthly or total(average of entire run)	

CA Tropical Fruit ground spray myclobutanil plus 1,2,4-triazole ASM = 315 days, AAqM = 630 days, Kd = 0.719 mg/L

stored as CATFGRD.out
Chemical: Myclobutanil total
PRZM environment: CAcitrus_WirrigSTD.txt modified Monday, 28 May 2007 at 22:41:26
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 16:33:30
Metfile: w23155.dvf modified Wedday, 3 July 2002 at 09:04:20
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	1.101	1.099	1.091	1.072	1.054	0.8495
1962	5.193	5.187	5.148	5.091	5.052	4.205
1963	12.38	12.36	12.31	12.19	12.04	10.18
1964	10.68	10.66	10.61	10.56	10.51	9.676

1965	10.53	10.51	10.46	10.36	10.29	9.313
1966	10.18	10.16	10.11	10.06	10.01	9.144
1967	9.973	9.964	9.926	9.817	9.75	8.906
1968	9.011	8.998	8.943	8.847	8.771	7.989
1969	8.347	8.335	8.288	8.18	8.11	7.355
1970	9.308	9.295	9.249	8.03	7.65	7.204
1971	9.791	9.778	9.724	9.676	9.657	8.988
1972	10.44	10.41	10.3	10.02	9.811	8.903
1973	10.56	10.55	10.49	10.43	10.35	9.376
1974	11.77	11.76	11.71	11.66	11.56	10.28
1975	11.05	11.03	11	10.94	10.89	9.949
1976	9.827	9.815	9.781	9.721	9.674	8.81
1977	9.982	9.965	9.915	9.836	9.736	8.938
1978	17.2	17.17	17.12	17.04	17.01	14.59
1979	13.82	13.8	13.76	13.71	13.67	12.42
1980	11.45	11.44	11.37	11.31	11.27	10.43
1981	10.56	10.54	10.49	10.4	10.3	9.412
1982	9.745	9.731	9.675	9.552	9.421	8.575
1983	10.05	10.03	10	9.94	9.89	9.195
1984	9.234	9.223	9.183	9.123	9.076	8.322
1985	8.098	8.086	8.035	7.978	7.93	7.355
1986	7.656	7.646	7.607	7.545	7.496	6.887
1987	8.055	8.042	7.988	7.936	7.887	7.394
1988	8.332	8.32	8.274	8.214	8.167	7.49
1989	8.137	8.129	8.077	8.023	7.982	7.285
1990	7.345	7.334	7.287	7.229	7.185	6.584

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly		
0.032258064516129			17.2	17.17	17.12	17.04	17.01	14.59
0.0645161290322581			13.82	13.8	13.76	13.71	13.67	12.42
0.0967741935483871			12.38	12.36	12.31	12.19	12.04	10.43
0.129032258064516			11.77	11.76	11.71	11.66	11.56	10.28
0.161290322580645			11.45	11.44	11.37	11.31	11.27	10.18
0.193548387096774			11.05	11.03	11	10.94	10.89	9.949
0.225806451612903			10.68	10.66	10.61	10.56	10.51	9.676
0.258064516129032			10.56	10.55	10.49	10.43	10.35	9.412
0.290322580645161			10.56	10.54	10.49	10.4	10.3	9.376
0.32258064516129			10.53	10.51	10.46	10.36	10.29	9.313
0.354838709677419			10.44	10.41	10.3	10.06	10.01	9.195
0.387096774193548			10.18	10.16	10.11	10.02	9.89	9.144
0.419354838709677			10.05	10.03	10	9.94	9.811	8.988
0.451612903225806			9.982	9.965	9.926	9.836	9.75	8.938
0.483870967741936			9.973	9.964	9.915	9.817	9.736	8.906
0.516129032258065			9.827	9.815	9.781	9.721	9.674	8.903
0.548387096774194			9.791	9.778	9.724	9.676	9.657	8.81
0.580645161290323			9.745	9.731	9.675	9.552	9.421	8.575
0.612903225806452			9.308	9.295	9.249	9.123	9.076	8.322
0.645161290322581			9.234	9.223	9.183	8.847	8.771	7.989
0.67741935483871			9.011	8.998	8.943	8.214	8.167	7.49
0.709677419354839			8.347	8.335	8.288	8.18	8.11	7.394
0.741935483870968			8.332	8.32	8.274	8.03	7.982	7.355
0.774193548387097			8.137	8.129	8.077	8.023	7.93	7.355
0.806451612903226			8.098	8.086	8.035	7.978	7.887	7.285
0.838709677419355			8.055	8.042	7.988	7.936	7.65	7.204
0.870967741935484			7.656	7.646	7.607	7.545	7.496	6.887
0.903225806451613			7.345	7.334	7.287	7.229	7.185	6.584
0.935483870967742			5.193	5.187	5.148	5.091	5.052	4.205
0.967741935483871			1.101	1.099	1.091	1.072	1.054	0.8495
0.1	12.319	12.3	12.25	12.137	11.992	10.415		

Average of yearly averages: 8.53348333333333

Inputs generated by pe5.pl - Novemeber 2006

Data used for this run:
Output File: CATFGRD
Metfile: w23155.dvf
PRZM scenario: CAcitrus_WirrigSTD.txt
EXAMS environment file: pond298.exv
Chemical Name: Myclobutanil total

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	288.8	g/mol	
Henry's Law Const.	henry		atm-m^3/mol	

```
Vapor Pressure vapr              torr
Solubility     sol     142       mg/L
Kd      Kd      0.719   mg/L
Koc     Koc             mg/L
Photolysis half-life   kdp              days    Half-life
Aerobic Aquatic Metabolism     kbacw   630     days    Halfife
Anaerobic Aquatic Metabolism   kbacs           days    Halfife
Aerobic Soil Metabolism        asm     315     days    Halfife
Hydrolysis:     pH 7           days    Half-life
Method: CAM     2       integer See PRZM manual
Incorporation Depth:   DEPI             cm
Application Rate:      TAPP     0.28    kg/ha
Application Efficiency:         APPEFF  0.99    fraction
Spray Drift     DRFT    0.01    fraction of application rate applied to pond
Application Date       Date     1-1     dd/mm or dd/mmm or dd-mm or dd-mmm
Interval 1      interval        14      days    Set to 0 or delete line for single app.
app. rate 1     apprate 0.28    kg/ha
Interval 2      interval        14      days    Set to 0 or delete line for single app.
app. rate 2     apprate 0.28    kg/ha
Interval 3      interval        14      days    Set to 0 or delete line for single app.
app. rate 3     apprate 0.28    kg/ha
Interval 4      interval        14      days    Set to 0 or delete line for single app.
app. rate 4     apprate 0.28    kg/ha
Interval 5      interval        14      days    Set to 0 or delete line for single app.
app. rate 5     apprate 0.28    kg/ha
Interval 6      interval        14      days    Set to 0 or delete line for single app.
app. rate 6     apprate 0.28    kg/ha
Interval 7      interval        14      days    Set to 0 or delete line for single app.
app. rate 7     apprate 0.28    kg/ha
Record 17:      FILTRA
        IPSCND
        UPTKF
Record 18:      PLVKRT
        PLDKRT
        FEXTRC  0.5
Flag for Index Res. Run        IR       EPA Pond
Flag for runoff calc.  RUNOFF  none     none, monthly or total(average of entire run)
```

FL Tropical Fruit aerial spray myclobutanil plus 1,2,4-triazole ASM = 315 days, AAqM = 630 days, Kd = 0.719 mg/L

stored as FLTFAIR.out
Chemical: Myclobutanil total
PRZM environment: FLavocadoSTD.txt modified Monday, 28 May 2007 at 22:44:32
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 16:33:30
Metfile: w12839.dvf modified Tueday, 2 July 2002 at 19:04:28
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	5.731	5.719	5.647	5.486	5.369	3.564
1962	9.155	9.131	9.074	8.869	8.732	7.144
1963	12.23	12.2	12.06	11.81	11.62	9.866
1964	13.8	13.76	13.61	13.33	13.14	11.52
1965	14.55	14.53	14.38	14.11	13.93	12.41
1966	17.79	17.75	17.58	17.16	16.84	14.4
1967	17.98	17.95	17.77	17.4	17.18	15.54
1968	18.95	18.91	18.73	18.39	18.15	16.15
1969	18.3	18.25	18.06	17.76	17.56	15.96
1970	18.5	18.45	18.24	17.93	17.62	15.82
1971	17.8	17.75	17.64	17.33	17.13	15.52
1972	17.91	17.87	17.68	17.33	17.1	15.4
1973	17.49	17.45	17.25	16.97	16.78	15.22
1974	17.1	17.05	16.86	16.56	16.36	14.77
1975	16.65	16.6	16.42	16.14	15.95	14.41
1976	16.7	16.65	16.48	16.19	15.97	14.39
1977	20.94	20.88	20.63	20.27	20.04	16.88
1978	19.5	19.45	19.22	18.95	18.75	17.09
1979	25.45	25.37	25.1	24.9	24.71	20.46
1980	22.66	22.6	22.35	22.1	21.9	20.15
1981	20.71	20.65	20.41	20.15	19.94	18.27
1982	20.84	20.78	20.54	20.27	20.06	17.82
1983	19.45	19.41	19.22	18.9	18.7	17.03
1984	18.98	18.93	18.84	18.54	18.3	16.59
1985	18.57	18.52	18.3	18.01	17.82	16.2
1986	18.41	18.36	18.16	17.87	17.67	15.9

1987	17.64	17.59	17.39	17.19	17	15.37
1988	17.74	17.7	17.5	17.12	16.89	15.2
1989	17.05	17.01	16.81	16.53	16.34	14.77
1990	16.77	16.73	16.54	16.25	16.06	14.45

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly	
0.032258064516129			25.45	25.37	25.1	24.9	24.71	20.46
0.0645161290322581			22.66	22.6	22.35	22.1	21.9	20.15
0.0967741935483871			20.94	20.88	20.63	20.27	20.06	18.27
0.129032258064516			20.84	20.78	20.54	20.27	20.04	17.82
0.161290322580645			20.71	20.65	20.41	20.15	19.94	17.09
0.193548387096774			19.5	19.45	19.22	18.95	18.75	17.03
0.225806451612903			19.45	19.41	19.22	18.9	18.7	16.88
0.258064516129032			18.98	18.93	18.84	18.54	18.3	16.59
0.290322580645161			18.95	18.91	18.73	18.39	18.15	16.2
0.32258064516129			18.57	18.52	18.3	18.01	17.82	16.15
0.354838709677419			18.5	18.45	18.24	17.93	17.67	15.96
0.387096774193548			18.41	18.36	18.16	17.87	17.62	15.9
0.419354838709677			18.3	18.25	18.06	17.76	17.56	15.82
0.451612903225806			17.98	17.95	17.77	17.4	17.18	15.54
0.483870967741936			17.91	17.87	17.68	17.33	17.13	15.52
0.516129032258065			17.8	17.75	17.64	17.33	17.1	15.4
0.548387096774194			17.79	17.75	17.58	17.19	17	15.37
0.580645161290323			17.74	17.7	17.5	17.16	16.89	15.22
0.612903225806452			17.64	17.59	17.39	17.12	16.84	15.2
0.645161290322581			17.49	17.45	17.25	16.97	16.78	14.77
0.67741935483871			17.1	17.05	16.86	16.56	16.36	14.77
0.709677419354839			17.05	17.01	16.81	16.53	16.34	14.45
0.741935483870968			16.77	16.73	16.54	16.25	16.06	14.41
0.774193548387097			16.7	16.65	16.48	16.19	15.97	14.4
0.806451612903226			16.65	16.6	16.42	16.14	15.95	14.39
0.838709677419355			14.55	14.53	14.38	14.11	13.93	12.41
0.870967741935484			13.8	13.76	13.61	13.33	13.14	11.52
0.903225806451613			12.23	12.2	12.06	11.81	11.62	9.866
0.935483870967742			9.155	9.131	9.074	8.869	8.732	7.144
0.967741935483871			5.731	5.719	5.647	5.486	5.369	3.564
0.1	20.93	20.87	20.621	20.27	20.058	18.225		

Average of yearly averages: 14.9421333333333

Inputs generated by pe5.pl - Novemeber 2006

Data used for this run:

Output File:	FLTFAIR			
Metfile:	w12839.dvf			
PRZM scenario:	FLavocadoSTD.txt			
EXAMS environment file:		pond298.exv		
Chemical Name:	Myclobutanil total			
Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	288.8	g/mol	
Henry's Law Const.	henry		atm-m^3/mol	
Vapor Pressure	vapr		torr	
Solubility	sol	142	mg/L	
Kd	Kd	0.719	mg/L	
Koc	Koc		mg/L	
Photolysis half-life	kdp		days	Half-life
Aerobic Aquatic Metabolism		kbacw	630	days Halfife
Anaerobic Aquatic Metabolism		kbacs		days Halfife
Aerobic Soil Metabolism		asm	315	days Halfife
Hydrolysis:	pH 7		days	Half-life
Method: CAM	2	integer	See PRZM manual	
Incorporation Depth:		DEPI		cm
Application Rate:		TAPP	0.28	kg/ha
Application Efficiency:		APPEFF	0.95	fraction
Spray Drift	DRFT	0.05	fraction of application rate applied to pond	
Application Date		Date	1-3	dd/mm or dd/mmm or dd-mm or dd-mmm
Interval 1	interval		14	days Set to 0 or delete line for single app.
app. rate 1	apprate	0.28	kg/ha	
Interval 2	interval		14	days Set to 0 or delete line for single app.
app. rate 2	apprate	0.28	kg/ha	
Interval 3	interval		14	days Set to 0 or delete line for single app.
app. rate 3	apprate	0.28	kg/ha	
Interval 4	interval		14	days Set to 0 or delete line for single app.
app. rate 4	apprate	0.28	kg/ha	
Interval 5	interval		14	days Set to 0 or delete line for single app.

```
app. rate 5     apprate 0.28    kg/ha
Interval 6      interval        14      days    Set to 0 or delete line for single app.
app. rate 6     apprate 0.28    kg/ha
Interval 7      interval        14      days    Set to 0 or delete line for single app.
app. rate 7     apprate 0.28    kg/ha
Record 17:      FILTRA
        IPSCND
        UPTKF
Record 18:      PLVKRT
        PLDKRT
        FEXTRC  0.5
Flag for Index Res. Run         IR      EPA Pond
Flag for runoff calc.  RUNOFF   none    none, monthly or total(average of entire run)
```

FL Tropical Fruit ground spray myclobutanil plus 1,2,4-triazole ASM = 315 days, AAqM = 630 days, Kd = 0.719 mg/L

stored as FLTFGRD.out
Chemical: Myclobutanil total
PRZM environment: FLavocadoSTD.txt modified Monday, 28 May 2007 at 22:44:32
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 16:33:30
Metfile: w12839.dvf modified Tueday, 2 July 2002 at 19:04:28
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	1.587	1.582	1.563	1.516	1.482	0.9316
1962	2.236	2.23	2.205	2.151	2.114	1.767
1963	3.241	3.232	3.195	3.138	3.1	2.551
1964	3.464	3.455	3.416	3.349	3.303	2.918
1965	3.427	3.418	3.386	3.323	3.283	2.969
1966	5.962	5.946	5.882	5.734	5.622	4.239
1967	5.705	5.694	5.638	5.497	5.392	4.927
1968	6.244	6.228	6.163	6.024	5.94	5.197
1969	5.345	5.331	5.289	5.24	5.2	4.83
1970	5.516	5.501	5.446	5.359	5.26	4.637
1971	4.909	4.897	4.85	4.771	4.721	4.358
1972	5.048	5.038	4.986	4.861	4.769	4.249
1973	4.498	4.487	4.438	4.387	4.348	4.016
1974	4.173	4.162	4.115	4.037	3.989	3.65
1975	3.835	3.825	3.783	3.726	3.687	3.374
1976	3.81	3.8	3.76	3.69	3.631	3.28
1977	8.029	8.005	7.936	7.79	7.707	5.739
1978	6.485	6.467	6.419	6.381	6.345	5.917
1979	13.13	13.1	12.99	12.8	12.61	9.466
1980	9.978	9.964	9.902	9.806	9.78	9.141
1981	7.79	7.769	7.732	7.708	7.692	7.182
1982	8.047	8.027	7.989	7.967	7.88	6.825
1983	6.588	6.57	6.508	6.444	6.408	5.986
1984	6.125	6.109	6.044	5.935	5.857	5.387
1985	5.409	5.395	5.339	5.273	5.226	4.855
1986	5.159	5.145	5.09	5.04	4.996	4.522
1987	4.678	4.664	4.607	4.518	4.478	4.137
1988	4.739	4.726	4.674	4.551	4.461	4.019
1989	4.204	4.192	4.146	4.095	4.057	3.726
1990	3.991	3.98	3.937	3.877	3.831	3.477

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly		
0.032258064516129		13.13	13.1	12.99	12.8	12.61	9.466	
0.0645161290322581		9.978	9.964	9.902	9.806	9.78	9.141	
0.0967741935483871		8.047	8.027	7.989	7.967	7.88	7.182	
0.129032258064516		8.029	8.005	7.936	7.79	7.707	6.825	
0.161290322580645		7.79	7.769	7.732	7.708	7.692	5.986	
0.193548387096774		6.588	6.57	6.508	6.444	6.408	5.917	
0.225806451612903		6.485	6.467	6.419	6.381	6.345	5.739	
0.258064516129032		6.244	6.228	6.163	6.024	5.94	5.387	
0.290322580645161		6.125	6.109	6.044	5.935	5.857	5.197	
0.32258064516129		5.962	5.946	5.882	5.734	5.622	4.927	
0.354838709677419		5.705	5.694	5.638	5.497	5.392	4.855	
0.387096774193548		5.516	5.501	5.446	5.359	5.26	4.83	
0.419354838709677		5.409	5.395	5.339	5.273	5.226	4.637	
0.451612903225806		5.345	5.331	5.289	5.24	5.2	4.522	
0.483870967741936		5.159	5.145	5.09	5.04	4.996	4.358	
0.516129032258065		5.048	5.038	4.986	4.861	4.769	4.249	
0.548387096774194		4.909	4.897	4.85	4.771	4.721	4.239	

0.580645161290323	4.739	4.726	4.674	4.551	4.478	4.137
0.612903225806452	4.678	4.664	4.607	4.518	4.461	4.019
0.645161290322581	4.498	4.487	4.438	4.387	4.348	4.016
0.67741935483871	4.204	4.192	4.146	4.095	4.057	3.726
0.709677419354839	4.173	4.162	4.115	4.037	3.989	3.65
0.741935483870968	3.991	3.98	3.937	3.877	3.831	3.477
0.774193548387097	3.835	3.825	3.783	3.726	3.687	3.374
0.806451612903226	3.81	3.8	3.76	3.69	3.631	3.28
0.838709677419355	3.464	3.455	3.416	3.349	3.303	2.969
0.870967741935484	3.427	3.418	3.386	3.323	3.283	2.918
0.903225806451613	3.241	3.232	3.195	3.138	3.1	2.551
0.935483870967742	2.236	2.23	2.205	2.151	2.114	1.767
0.967741935483871	1.587	1.582	1.563	1.516	1.482	0.9316

0.1 8.0452 8.0248 7.9837 7.9493 7.8627 7.1463
Average of yearly averages: 4.60908666666667

Inputs generated by pe5.pl - Novemeber 2006

Data used for this run:
Output File: FLTFGRD
Metfile: w12839.dvf
PRZM scenario: FLavocadoSTD.txt
EXAMS environment file: pond298.exv
Chemical Name: Myclobutanil total

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	288.8	g/mol	
Henry's Law Const.	henry		atm-m^3/mol	
Vapor Pressure	vapr		torr	
Solubility	sol	142	mg/L	
Kd Kd	Kd	0.719	mg/L	
Koc Koc	Koc		mg/L	
Photolysis half-life	kdp		days	Half-life
Aerobic Aquatic Metabolism	kbacw	630	days	Halfife
Anaerobic Aquatic Metabolism	kbacs		days	Halfife
Aerobic Soil Metabolism	asm	315	days	Halfife
Hydrolysis: pH 7			days	Half-life
Method: CAM 2	integer	See PRZM manual		
Incorporation Depth:	DEPI		cm	
Application Rate:	TAPP	0.28	kg/ha	
Application Efficiency:	APPEFF	0.99	fraction	
Spray Drift DRFT	0.01	fraction of application rate applied to pond		
Application Date	Date	1-3	dd/mm or dd/mmm or dd-mm or dd-mmm	
Interval 1	interval	14	days	Set to 0 or delete line for single app.
app. rate 1	apprate	0.28	kg/ha	
Interval 2	interval	14	days	Set to 0 or delete line for single app.
app. rate 2	apprate	0.28	kg/ha	
Interval 3	interval	14	days	Set to 0 or delete line for single app.
app. rate 3	apprate	0.28	kg/ha	
Interval 4	interval	14	days	Set to 0 or delete line for single app.
app. rate 4	apprate	0.28	kg/ha	
Interval 5	interval	14	days	Set to 0 or delete line for single app.
app. rate 5	apprate	0.28	kg/ha	
Interval 6	interval	14	days	Set to 0 or delete line for single app.
app. rate 6	apprate	0.28	kg/ha	
Interval 7	interval	14	days	Set to 0 or delete line for single app.
app. rate 7	apprate	0.28	kg/ha	
Record 17: FILTRA				
IPSCND				
UPTKF				
Record 18: PLVKRT				
PLDKRT				
FEXTRC 0.5				
Flag for Index Res. Run	IR	EPA Pond		
Flag for runoff calc. RUNOFF	none	none, monthly or total(average of entire run)		

LA Tropical Fruit aerial spray myclobutanil plus 1,2,4-triazole ASM = 315 days, AAqM = 630 days, Kd = 0.719 mg/L

stored as LATFAIR.out
Chemical: Myclobutanil total
PRZM environment: LAsugarcaneSTD.txt modified Monday, 28 May 2007 at 22:56:00
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 16:33:30
Metfile: w13970.dvf modified Wedday, 3 July 2002 at 09:05:36
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	42.64	42.53	42.25	41.66	41.06	28.84
1962	102	102	101	98.32	96.29	73.46
1963	83.85	83.66	83.28	82.41	82.23	78.64
1964	109	109	108	107	107	94.24
1965	117	116	115	115	113	105
1966	124	123	123	122	122	111
1967	200	199	198	196	195	160
1968	172	172	171	170	169	160
1969	182	181	180	176	175	162
1970	189	189	188	187	185	170
1971	178	177	176	174	172	161
1972	190	190	188	186	184	163
1973	197	196	195	193	192	172
1974	175	174	173	173	172	161
1975	187	187	186	184	183	165
1976	193	192	191	190	187	169
1977	191	191	190	186	184	170
1978	178	177	177	175	174	161
1979	192	192	190	188	187	171
1980	243	242	240	233	232	203
1981	213	212	210	207	206	195
1982	185	185	184	183	181	171
1983	203	203	202	198	196	177
1984	180	180	179	177	176	167
1985	165	164	162	160	159	151
1986	171	170	169	167	164	147
1987	167	167	166	165	164	151
1988	164	164	163	160	159	148
1989	182	181	180	177	175	156
1990	168	167	166	165	165	155

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	243	242	240	233	232	203
0.0645161290322581	213	212	210	207	206	195
0.0967741935483871	203	203	202	198	196	177
0.129032258064516	200	199	198	196	195	172
0.161290322580645	197	196	195	193	192	171
0.193548387096774	193	192	191	190	187	171
0.225806451612903	192	192	190	188	187	170
0.258064516129032	191	191	190	187	185	170
0.290322580645161	190	190	188	186	184	169
0.32258064516129	189	189	188	186	184	167
0.354838709677419	187	187	186	184	183	165
0.387096774193548	185	185	184	183	181	163
0.419354838709677	182	181	180	177	176	162
0.451612903225806	182	181	180	177	175	161
0.483870967741936	180	180	179	176	175	161
0.516129032258065	178	177	177	175	174	161
0.548387096774194	178	177	176	174	172	160
0.580645161290323	175	174	173	173	172	160
0.612903225806452	172	172	171	170	169	156
0.645161290322581	171	170	169	167	165	155
0.67741935483871	168	167	166	165	164	151
0.709677419354839	167	167	166	165	164	151
0.741935483870968	165	164	163	160	159	148
0.774193548387097	164	164	162	160	159	147
0.806451612903226	124	123	123	122	122	111
0.838709677419355	117	116	115	115	113	105
0.870967741935484	109	109	108	107	107	94.24
0.903225806451613	102	102	101	98.32	96.29	78.64
0.935483870967742	83.85	83.66	83.28	82.41	82.23	73.46
0.967741935483871	42.64	42.53	42.25	41.66	41.06	28.84

0.1	202.7	202.6	201.6	197.8	195.9	176.5

Average of yearly averages: 148.572666666667

Inputs generated by pe5.pl - Novemeber 2006

Data used for this run:
Output File: LATFAIR
Metfile: w13970.dvf
PRZM scenario: LAsugarcaneSTD.txt
EXAMS environment file: pond298.exv

Chemical Name: Myclobutanil total

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	288.8	g/mol	
Henry's Law Const.	henry		atm-m^3/mol	
Vapor Pressure	vapr		torr	
Solubility	sol	142	mg/L	
Kd Kd	0.719	mg/L		
Koc Koc		mg/L		
Photolysis half-life	kdp		days	Half-life
Aerobic Aquatic Metabolism	kbacw	630	days	Halfife
Anaerobic Aquatic Metabolism	kbacs		days	Halfife
Aerobic Soil Metabolism	asm	315	days	Halfife
Hydrolysis: pH 7		days	Half-life	
Method: CAM	2	integer	See PRZM manual	
Incorporation Depth:	DEPI		cm	
Application Rate:	TAPP	0.28	kg/ha	
Application Efficiency:	APPEFF	0.95	fraction	
Spray Drift	DRFT	0.05	fraction of application rate applied to pond	
Application Date	Date	1-3	dd/mm or dd/mmm or dd-mm or dd-mmm	
Interval 1	interval	14	days	Set to 0 or delete line for single app.
app. rate 1	apprate	0.28	kg/ha	
Interval 2	interval	14	days	Set to 0 or delete line for single app.
app. rate 2	apprate	0.28	kg/ha	
Interval 3	interval	14	days	Set to 0 or delete line for single app.
app. rate 3	apprate	0.28	kg/ha	
Interval 4	interval	14	days	Set to 0 or delete line for single app.
app. rate 4	apprate	0.28	kg/ha	
Interval 5	interval	14	days	Set to 0 or delete line for single app.
app. rate 5	apprate	0.28	kg/ha	
Interval 6	interval	14	days	Set to 0 or delete line for single app.
app. rate 6	apprate	0.28	kg/ha	
Interval 7	interval	14	days	Set to 0 or delete line for single app.
app. rate 7	apprate	0.28	kg/ha	
Record 17:	FILTRA			
IPSCND				
UPTKF				
Record 18:	PLVKRT			
PLDKRT				
FEXTRC	0.5			
Flag for Index Res. Run	IR	EPA Pond		
Flag for runoff calc.	RUNOFF	none	none, monthly or total(average of entire run)	

LA Tropical Fruit ground spray myclobutanil plus 1,2,4-triazole ASM = 315 days, AAqM = 630 days, Kd = 0.719 mg/L

stored as LATFGRD.out
Chemical: Myclobutanil total
PRZM environment: LAsugarcaneSTD.txt modified Monday, 28 May 2007 at 22:56:00
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 16:33:30
Metfile: w13970.dvf modified Wedday, 3 July 2002 at 09:05:36
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	40.04	39.94	39.69	39.14	38.59	27.17
1962	98.55	98.38	97.49	94.99	93.03	70.5
1963	80.4	80.35	80.13	79.6	79.14	73.61
1964	102	102	102	99.99	100	88.11
1965	108	108	107	107	105	97.83
1966	115	115	114	113	113	103
1967	193	193	191	189	188	154
1968	164	163	163	162	162	153
1969	174	173	172	168	167	155
1970	181	181	180	179	177	162
1971	169	168	167	165	163	153
1972	182	181	180	177	175	155
1973	189	189	187	185	184	164
1974	166	165	164	164	163	153
1975	178	178	177	175	174	157
1976	184	184	183	181	178	160
1977	183	183	181	177	175	161
1978	169	168	167	165	164	152
1979	183	183	181	179	178	162
1980	236	235	233	227	224	196
1981	204	204	202	199	197	188
1982	176	176	174	173	172	163

1983	195	194	193	190	187	169
1984	170	170	169	167	166	158
1985	154	154	152	149	148	141
1986	161	160	159	157	154	138
1987	158	157	156	155	154	142
1988	154	154	152	150	149	139
1989	172	172	170	167	166	147
1990	158	158	156	155	155	146

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly		
0.032258064516129			236	235	233	227	224	196
0.0645161290322581			204	204	202	199	197	188
0.0967741935483871			195	194	193	190	188	169
0.129032258064516			193	193	191	189	187	164
0.161290322580645			189	189	187	185	184	163
0.193548387096774			184	184	183	181	178	162
0.225806451612903			183	183	181	179	178	162
0.258064516129032			183	183	181	179	177	161
0.290322580645161			182	181	180	177	175	160
0.32258064516129			181	181	180	177	175	158
0.354838709677419			178	178	177	175	174	157
0.387096774193548			176	176	174	173	172	155
0.419354838709677			174	173	172	168	167	155
0.451612903225806			172	172	170	167	166	154
0.483870967741936			170	170	169	167	166	153
0.516129032258065			169	168	167	165	164	153
0.548387096774194			169	168	167	165	163	153
0.580645161290323			166	165	164	164	163	152
0.612903225806452			164	163	163	162	162	147
0.645161290322581			161	160	159	157	155	146
0.67741935483871			158	158	156	155	154	142
0.709677419354839			158	157	156	155	154	141
0.741935483870968			154	154	152	150	149	139
0.774193548387097			154	154	152	149	148	138
0.806451612903226			115	115	114	113	113	103
0.838709677419355			108	108	107	107	105	97.83
0.870967741935484			102	102	102	99.99	100	88.11
0.903225806451613			98.55	98.38	97.49	94.99	93.03	73.61
0.935483870967742			80.4	80.35	80.13	79.6	79.14	70.5
0.967741935483871			40.04	39.94	39.69	39.14	38.59	27.17
0.1	194.8	193.9	192.8	189.9	187.9	168.5		

Average of yearly averages: 140.940666666667

Inputs generated by pe5.pl - Novemeber 2006

Data used for this run:
Output File: LATFGRD
Metfile: w13970.dvf
PRZM scenario: LAsugarcaneSTD.txt
EXAMS environment file: pond298.exv
Chemical Name: Myclobutanil total

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	288.8	g/mol	
Henry's Law Const.	henry		atm-m^3/mol	
Vapor Pressure	vapr		torr	
Solubility	sol	142	mg/L	
Kd Kd	0.719	mg/L		
Koc Koc		mg/L		
Photolysis half-life	kdp		days	Half-life
Aerobic Aquatic Metabolism	kbacw	630	days	Halfife
Anaerobic Aquatic Metabolism	kbacs		days	Halfife
Aerobic Soil Metabolism	asm	315	days	Halfife
Hydrolysis: pH 7		days	Half-life	
Method: CAM	2	integer	See PRZM manual	
Incorporation Depth:	DEPI		cm	
Application Rate:	TAPP	0.28	kg/ha	
Application Efficiency:		APPEFF	0.99	fraction
Spray Drift	DRFT	0.01	fraction of application rate applied to pond	
Application Date	Date	1-3	dd/mm or dd/mmm or dd-mm or dd-mmm	
Interval 1	interval	14	days	Set to 0 or delete line for single app.
app. rate 1	apprate	0.28	kg/ha	
Interval 2	interval	14	days	Set to 0 or delete line for single app.
app. rate 2	apprate	0.28	kg/ha	
Interval 3	interval	14	days	Set to 0 or delete line for single app.

app. rate 3	apprate	0.28	kg/ha	
Interval 4	interval		14	days	Set to 0 or delete line for single app.
app. rate 4	apprate	0.28	kg/ha	
Interval 5	interval		14	days	Set to 0 or delete line for single app.
app. rate 5	apprate	0.28	kg/ha	
Interval 6	interval		14	days	Set to 0 or delete line for single app.
app. rate 6	apprate	0.28	kg/ha	
Interval 7	interval		14	days	Set to 0 or delete line for single app.
app. rate 7	apprate	0.28	kg/ha	
Record 17:	FILTRA			
IPSCND				
UPTKF				
Record 18:	PLVKRT			
PLDKRT				
FEXTRC	0.5			
Flag for Index Res. Run			IR	EPA Pond
Flag for runoff calc.	RUNOFF		none	none, monthly or total(average of entire run)

PR Tropical Fruit aerial spray myclobutanil plus 1,2,4-triazole ASM = 315 days, AAqM = 630 days, Kd = 0.719 mg/L

stored as PRTFAIR.out
Chemical: Myclobutanil total
PRZM environment: PRcoffeeSTD.txt modified Wedday, 22 February 2006 at 20:50:14
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 16:33:30
Metfile: w11641.dvf modified Tueday, 2 July 2002 at 19:06:16
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	11.98	11.95	11.86	11.63	11.51	8.084
1962	20.43	20.38	20.21	19.86	19.56	16.13
1963	29.88	29.8	29.65	29.03	28.58	23.84
1964	31.38	31.3	31.13	30.55	30.23	26.44
1965	39.36	39.27	38.94	38.01	37.35	31.12
1966	55.26	55.12	54.88	54.2	53.41	44.32
1967	47.72	47.63	47.16	46.42	45.71	42.01
1968	42.78	42.68	42.44	41.69	40.97	37.08
1969	55.16	55.01	54.57	53.78	52.88	45.52
1970	66.13	65.96	65.28	64.89	63.95	52.82
1971	59.5	59.34	58.68	57.15	56.03	51.29
1972	52.8	52.67	52.39	52.13	51.7	46.07
1973	64.2	64.03	63.57	62.65	61.86	52.72
1974	48.67	48.59	48.13	47.9	47.92	44.47
1975	41.25	41.13	40.79	40.01	39.34	36.66
1976	58.62	58.46	57.81	56.52	55.98	45.7
1977	64	63.85	63.26	61.73	60.58	51.59
1978	65.54	65.37	64.99	63.64	62.44	54.95
1979	62.13	61.96	61.29	59.7	58.68	52.42
1980	54.63	54.5	53.96	52.73	52.21	46.94
1981	55.01	54.86	54.55	53.44	52.51	46.25
1982	61.01	60.94	60.32	58.77	57.6	48.99
1983	78.97	78.74	77.8	76.22	75.19	61.51
1984	57.68	57.56	57.04	56.69	56.66	52.77
1985	59.56	59.44	58.85	57.39	56.26	49.19
1986	80.23	80.02	79.14	77.12	75.59	61.84
1987	116	116	115	112	110	90.54
1988	143	143	141	138	137	112
1989	110	110	110	108	108	100
1990	84.8	84.58	83.81	82.69	82.02	76.88

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	143	143	141	138	137	112
0.0645161290322581	116	116	115	112	110	100
0.0967741935483871	110	110	110	108	108	90.54
0.129032258064516	84.8	84.58	83.81	82.69	82.02	76.88
0.161290322580645	80.23	80.02	79.14	77.12	75.59	61.84
0.193548387096774	78.97	78.74	77.8	76.22	75.19	61.51
0.225806451612903	66.13	65.96	65.28	64.89	63.95	54.95
0.258064516129032	65.54	65.37	64.99	63.64	62.44	52.82
0.290322580645161	64.2	64.03	63.57	62.65	61.86	52.77
0.32258064516129	64	63.85	63.26	61.73	60.58	52.72
0.354838709677419	62.13	61.96	61.29	59.7	58.68	52.42

0.387096774193548	61.01	60.94	60.32	58.77	57.6	51.59
0.419354838709677	59.56	59.44	58.85	57.39	56.66	51.29
0.451612903225806	59.5	59.34	58.68	57.15	56.26	49.19
0.483870967741936	58.62	58.46	57.81	56.69	56.03	48.99
0.516129032258065	57.68	57.56	57.04	56.52	55.98	46.94
0.548387096774194	55.26	55.12	54.88	54.2	53.41	46.25
0.580645161290323	55.16	55.01	54.57	53.78	52.88	46.07
0.612903225806452	55.01	54.86	54.55	53.44	52.51	45.7
0.645161290322581	54.63	54.5	53.96	52.73	52.21	45.52
0.67741935483871	52.8	52.67	52.39	52.13	51.7	44.47
0.709677419354839	48.67	48.59	48.13	47.9	47.92	44.32
0.741935483870968	47.72	47.63	47.16	46.42	45.71	42.01
0.774193548387097	42.78	42.68	42.44	41.69	40.97	37.08
0.806451612903226	41.25	41.13	40.79	40.01	39.34	36.66
0.838709677419355	39.36	39.27	38.94	38.01	37.35	31.12
0.870967741935484	31.38	31.3	31.13	30.55	30.23	26.44
0.903225806451613	29.88	29.8	29.65	29.03	28.58	23.84
0.935483870967742	20.43	20.38	20.21	19.86	19.56	16.13
0.967741935483871	11.98	11.95	11.86	11.63	11.51	8.084

0.1 107.48 107.458 107.381 105.469 105.402 89.174

Average of yearly averages: 50.3381333333333

Inputs generated by pe5.pl - Novemeber 2006

Data used for this run:
Output File: PRTFAIR
Metfile: w11641.dvf
PRZM scenario: PRcoffeeSTD.txt
EXAMS environment file: pond298.exv
Chemical Name: Myclobutanil total

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	288.8	g/mol	
Henry's Law Const.	henry		atm-m^3/mol	
Vapor Pressure	vapr		torr	
Solubility	sol	142	mg/L	
Kd Kd	0.719	mg/L		
Koc Koc		mg/L		
Photolysis half-life	kdp		days	Half-life
Aerobic Aquatic Metabolism	kbacw	630	days	Halfife
Anaerobic Aquatic Metabolism	kbacs		days	Halfife
Aerobic Soil Metabolism	asm	315	days	Halfife
Hydrolysis:	pH 7		days	Half-life
Method: CAM	2	integer	See PRZM manual	
Incorporation Depth:	DEPI		cm	
Application Rate:	TAPP	0.28	kg/ha	
Application Efficiency:		APPEFF	0.95	fraction
Spray Drift	DRFT	0.05	fraction of application rate applied to pond	
Application Date	Date	1-2	dd/mm or dd/mmm or dd-mm or dd-mmm	
Interval 1	interval	14	days	Set to 0 or delete line for single app.
app. rate 1	apprate	0.28	kg/ha	
Interval 2	interval	14	days	Set to 0 or delete line for single app.
app. rate 2	apprate	0.28	kg/ha	
Interval 3	interval	14	days	Set to 0 or delete line for single app.
app. rate 3	apprate	0.28	kg/ha	
Interval 4	interval	14	days	Set to 0 or delete line for single app.
app. rate 4	apprate	0.28	kg/ha	
Interval 5	interval	14	days	Set to 0 or delete line for single app.
app. rate 5	apprate	0.28	kg/ha	
Interval 6	interval	14	days	Set to 0 or delete line for single app.
app. rate 6	apprate	0.28	kg/ha	
Interval 7	interval	14	days	Set to 0 or delete line for single app.
app. rate 7	apprate	0.28	kg/ha	
Record 17:	FILTRA			
IPSCND				
UPTKF				
Record 18:	PLVKRT			
PLDKRT				
FEXTRC	0.5			
Flag for Index Res. Run	IR	EPA Pond		
Flag for runoff calc.	RUNOFF	none	none, monthly or total(average of entire run)	

PR Tropical Fruit ground spray myclobutanil plus 1,2,4-triazole ASM = 315 days, AAqM = 630 days, Kd = 0.719 mg/L

stored as PRTFGRD.out
Chemical: Myclobutanil total
PRZM environment: PRcoffeeSTD.txt modified Wedday, 22 February 2006 at 20:50:14
EXAMS environment: pond298.exv modified Thuday, 29 August 2002 at 16:33:30
Metfile: w11641.dvf modified Tueday, 2 July 2002 at 19:06:16
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	8.239	8.222	8.171	7.974	7.86	5.374
1962	14.09	14.06	13.95	13.67	13.48	11.04
1963	22.11	22.05	21.9	21.45	21.08	17.3
1964	22.56	22.51	22.38	21.99	21.67	18.93
1965	29.98	29.92	29.65	28.94	28.39	23.05
1966	46.36	46.24	45.82	45.25	44.56	36.33
1967	37.86	37.8	37.42	36.8	36.21	33.59
1968	32.44	32.36	32.22	31.65	31.12	28.23
1969	45.26	45.14	44.79	44.09	43.37	36.86
1970	56.68	56.61	56	55.57	54.79	44.4
1971	49.76	49.63	49.07	47.8	46.86	42.86
1972	43.68	43.58	43.29	42.72	42.22	37.52
1973	55.1	54.99	54.45	53.46	52.81	44.56
1974	41	40.91	40.54	39.82	39.71	36
1975	31.17	31.08	30.86	30.35	29.88	27.84
1976	48.89	48.76	48.21	47.12	46.59	37.18
1977	54.66	54.52	53.99	52.69	51.71	43.27
1978	55.95	55.81	55.54	54.44	53.42	46.76
1979	52.47	52.33	51.77	50.41	49.44	44.16
1980	44.95	44.85	44.35	43.3	42.76	38.57
1981	45.36	45.25	45.02	44.09	43.34	38.04
1982	51.57	51.49	50.97	49.65	48.65	40.84
1983	70.31	70.1	69.26	67.82	66.91	53.93
1984	51.31	51.2	50.74	50.12	49.69	44.8
1985	49.96	49.85	49.34	48.11	47.18	40.87
1986	71.25	71.06	70.28	68.46	67.1	53.88
1987	109	109	108	105	103	83.78
1988	137	137	135	132	131	107
1989	105	105	104	102	102	93.97
1990	78.15	77.99	77.31	75.96	75.36	69.55

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258064516129	137	137	135	132	131	107
0.0645161290322581	109	109	108	105	103	93.97
0.0967741935483871	105	105	104	102	102	83.78
0.129032258064516	78.15	77.99	77.31	75.96	75.36	69.55
0.161290322580645	71.25	71.06	70.28	68.46	67.1	53.93
0.193548387096774	70.31	70.1	69.26	67.82	66.91	53.88
0.225806451612903	56.68	56.61	56	55.57	54.79	46.76
0.258064516129032	55.95	55.81	55.54	54.44	53.42	44.8
0.290322580645161	55.1	54.99	54.45	53.46	52.81	44.56
0.32258064516129	54.66	54.52	53.99	52.69	51.71	44.4
0.354838709677419	52.47	52.33	51.77	50.41	49.69	44.16
0.387096774193548	51.57	51.49	50.97	50.12	49.44	43.27
0.419354838709677	51.31	51.2	50.74	49.65	48.65	42.86
0.451612903225806	49.96	49.85	49.34	48.11	47.18	40.87
0.483870967741936	49.76	49.63	49.07	47.8	46.86	40.84
0.516129032258065	48.89	48.76	48.21	47.12	46.59	38.57
0.548387096774194	46.36	46.24	45.82	45.25	44.56	38.04
0.580645161290323	45.36	45.25	45.02	44.09	43.37	37.52
0.612903225806452	45.26	45.14	44.79	44.09	43.34	37.18
0.645161290322581	44.95	44.85	44.35	43.3	42.76	36.86
0.67741935483871	43.68	43.58	43.29	42.72	42.22	36.33
0.709677419354839	41	40.91	40.54	39.82	39.71	36
0.741935483870968	37.86	37.8	37.42	36.8	36.21	33.59
0.774193548387097	32.44	32.36	32.22	31.65	31.12	28.23
0.806451612903226	31.17	31.08	30.86	30.35	29.88	27.84
0.838709677419355	29.98	29.92	29.65	28.94	28.39	23.05
0.870967741935484	22.56	22.51	22.38	21.99	21.67	18.93
0.903225806451613	22.11	22.05	21.9	21.45	21.08	17.3
0.935483870967742	14.09	14.06	13.95	13.67	13.48	11.04
0.967741935483871	8.239	8.222	8.171	7.974	7.86	5.374

0.1	102.315	102.299	101.331	99.396	99.336	82.357

Average of yearly averages: 42.6828

Inputs generated by pe5.pl - Novemeber 2006

Data used for this run:
Output File: PRTFGRD
Metfile: w11641.dvf
PRZM scenario: PRcoffeeSTD.txt
EXAMS environment file: pond298.exv
Chemical Name: Myclobutanil total

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	288.8	g/mol	
Henry's Law Const.	henry		atm-m^3/mol	
Vapor Pressure	vapr		torr	
Solubility	sol	142	mg/L	
Kd Kd	Kd	0.719	mg/L	
Koc Koc			mg/L	
Photolysis half-life	kdp		days	Half-life
Aerobic Aquatic Metabolism	kbacw	630	days	Halfife
Anaerobic Aquatic Metabolism	kbacs		days	Halfife
Aerobic Soil Metabolism	asm	315	days	Halfife
Hydrolysis:	pH 7		days	Half-life
Method: CAM	2	integer	See PRZM manual	
Incorporation Depth:	DEPI		cm	
Application Rate:	TAPP	0.28	kg/ha	
Application Efficiency:		APPEFF	0.99	fraction
Spray Drift	DRFT	0.01	fraction of application rate applied to pond	
Application Date	Date	1-2	dd/mm or dd/mmm or dd-mm or dd-mmm	
Interval 1	interval	14	days	Set to 0 or delete line for single app.
app. rate 1	apprate	0.28	kg/ha	
Interval 2	interval	14	days	Set to 0 or delete line for single app.
app. rate 2	apprate	0.28	kg/ha	
Interval 3	interval	14	days	Set to 0 or delete line for single app.
app. rate 3	apprate	0.28	kg/ha	
Interval 4	interval	14	days	Set to 0 or delete line for single app.
app. rate 4	apprate	0.28	kg/ha	
Interval 5	interval	14	days	Set to 0 or delete line for single app.
app. rate 5	apprate	0.28	kg/ha	
Interval 6	interval	14	days	Set to 0 or delete line for single app.
app. rate 6	apprate	0.28	kg/ha	
Interval 7	interval	14	days	Set to 0 or delete line for single app.
app. rate 7	apprate	0.28	kg/ha	
Record 17:	FILTRA			
IPSCND				
UPTKF				
Record 18:	PLVKRT			
PLDKRT				
FEXTRC	0.5			
Flag for Index Res. Run	IR	EPA Pond		
Flag for runoff calc.	RUNOFF	none	none, monthly or total(average of entire run)	

Analysis Summary of Myclobutanil Concentrations in USGS NAWQA Surface Water Monitoring Data

USGS Station ID	Count	Maximum	Average
01104615	11	0.033	0.0163
01170970	28	0.008	0.008
01184000	11	0.033	0.017090909
01209710	30	0.033	0.009716667
01349150	31	0.033	0.020716129
01356190	29	0.033	0.020731034
01357500	23	0.033	0.018869565
01374987	1	0.0398	0.0398
01403300	21	0.033	0.016914286
01463500	12	0.033	0.01425
01464907	1	0.008	0.008
01493499	2	0.008	0.008
0149349945	1	0.008	0.008
0149349949	2	0.008	0.008
0149349970	2	0.008	0.008
0149349980	2	0.008	0.008
01493500	52	0.0158	0.00815
01610400	1	0.033	0.033
01646580	12	0.033	0.01295
01654000	30	0.033	0.009423333
02081190	2	0.008	0.008
02081510	1	0.008	0.008
02081511	1	0.008	0.008
0208500600	6	0.008	0.008
0208501535	1	0.008	0.008
02085430	2	0.008	0.008
0208725055	6	0.0114	0.008566667
0208726370	6	0.008	0.008
0208726995	6	0.0098	0.0083
0208730725	6	0.008	0.008
0208732610	6	0.008	0.008
0208755215	10	0.02	0.01108
02087580	13	0.035	0.018607692
0208758440	2	0.008	0.008
0208794025	3	0.008	0.008
0208794555	3	0.008	0.008
02089500	12	0.033	0.01425
02091500	12	0.033	0.01425
0209517912	2	0.008	0.008
0209647280	2	0.008	0.008
0209647295	2	0.008	0.008
0209651815	2	0.008	0.008
0209665940	2	0.008	0.008

USGS Station ID	Count	Maximum	Average
0209665990	2	0.008	0.008
0209679804	2	0.008	0.008
0209695780	2	0.008	0.008
0209697900	2	0.008	0.008
02097355	3	0.008	0.008
0209737400	3	0.008	0.008
02097464	6	0.008	0.008
0209750881	2	0.008	0.008
02099238	2	0.0195	0.0131
02099480	2	0.008	0.008
02100295	2	0.008	0.008
02100634	2	0.008	0.008
0211583580	2	0.008	0.008
02169570	24	0.033	0.017625
02174250	22	0.033	0.019918182
02175000	22	0.033	0.019363636
02204230	2	0.008	0.008
02204468	2	0.008	0.008
02206314	2	0.008	0.008
02208150	2	0.008	0.008
02213450	2	0.008	0.008
02217293	2	0.008	0.008
02217471	2	0.008	0.008
02218700	2	0.008	0.008
02221000	2	0.008	0.008
02281200	10	0.033	0.013
02317797	18	0.008	0.008
02318500	30	0.033	0.010606667
02334885	9	0.033	0.012866667
02335870	36	0.07	0.012133333
02335910	2	0.008	0.008
02336635	9	0.033	0.011822222
02336728	2	0.008	0.008
02336822	2	0.008	0.008
02336876	2	0.008	0.008
02336968	9	0.033	0.011722222
02337395	6	0.008	0.008
02338000	12	0.033	0.015858333
02338280	2	0.008	0.008
02338375	2	0.008	0.008
02338523	8	0.008	0.008
02339480	2	0.008	0.008
02340282	2	0.008	0.008
02344340	2	0.008	0.008
02344480	6	0.008	0.008
02344737	5	0.008	0.008
02344797	9	0.033	0.013788889
02344887	2	0.008	0.008
02346358	2	0.008	0.008

USGS Station ID	Count	Maximum	Average
02347748	6	0.008	0.008
02350080	36	0.033	0.010083333
0242354750	12	0.033	0.014683333
02469762	12	0.033	0.01425
03353637	19	0.0098	0.007484211
03361638	48	0.008	0.008
03374100	16	0.033	0.0119625
0357479650	12	0.033	0.01425
03575100	12	0.033	0.01425
04072016	1	0.008	0.008
04072233	2	0.008	0.008
04078085	2	0.008	0.008
04080791	1	0.008	0.008
04081897	6	0.008	0.008
04084429	6	0.008	0.008
04084468	2	0.0178	0.0129
04085046	2	0.008	0.008
04085068	1	0.008	0.008
040850683	1	0.008	0.008
040851235	2	0.008	0.008
040851325	6	0.008	0.008
04085188	6	0.008	0.008
040851932	2	0.008	0.008
04085270	2	0.008	0.008
040853145	6	0.008	0.007883333
04085322	2	0.008	0.008
040854395	2	0.008	0.008
04085455	2	0.008	0.008
04086699	2	0.0124	0.00895
040869415	23	0.008	0.008
04087030	5	0.008	0.008
0408703164	2	0.008	0.008
04087070	1	0.008	0.008
040870856	2	0.008	0.008
04087118	5	0.008	0.008
04087204	5	0.008	0.008
04087213	2	0.008	0.008
04087220	1	0.008	0.008
040872393	2	0.008	0.008
04087258	6	0.008	0.007466667
04087270	2	0.008	0.008
04161820	17	0.033	0.019764706
04186500	27	0.033	0.018185185
04193500	23	0.033	0.019613043
05288705	30	0.033	0.022206667
05320270	23	0.033	0.021043478
05451210	31	0.033	0.022516129
05465500	23	0.033	0.018869565
05527729	2	0.0539	0.0326

USGS Station ID	Count	Maximum	Average
05531500	12	0.033	0.013116667
055437901	2	0.008	0.008
05543796	1	0.008	0.008
05572000	30	0.033	0.022166667
05586100	24	0.033	0.019458333
06329500	2	0.008	0.008
06713500	32	0.033	0.01040625
06753990	1	0.008	0.008
06754000	11	0.04	0.017727273
06799750	24	0.008	0.008
06800000	70	0.033	0.008714286
06805500	12	0.033	0.01425
07053250	18	0.033	0.010777778
07288650	31	0.033	0.010622581
07288955	36	0.033	0.014275
08012150	12	0.033	0.014925
08049580	2	0.008	0.008
08055500	30	0.008	0.008
08057200	36	0.033	0.011688889
08057410	12	0.033	0.014933333
08064100	9	0.033	0.013555556
08178800	30	0.033	0.0114
08364000	32	0.033	0.0142625
09163500	9	0.033	0.013555556
094196783	31	0.033	0.010419355
10168000	12	0.033	0.014141667
10347699	17	0.008	0.008
10350340	4	0.033	0.02675
10350500	8	0.017	0.009125
11074000	12	0.033	0.01425
11273500	38	0.033	0.010965789
11274538	28	0.38	0.032889286
11303500	35	0.033	0.009882857
11447360	30	0.0598	0.023103333
11447650	35	0.033	0.014357143
12128000	30	0.033	0.0114
12504508	12	0.008	0.0071
12505450	53	0.192	0.010690566
12510500	29	0.033	0.009593103
13092747	30	0.033	0.009666667
13154500	34	0.033	0.013882353
14199710	2	0.008	0.008
14201300	30	0.311	0.052703333
14205400	6	0.008	0.008
14206347	2	0.008	0.008
14206750	2	0.008	0.008
14206950	32	0.033	0.009871875
14211315	2	0.008	0.008
14211720	15	0.033	0.013

USGS Station ID	Count	Maximum	Average
280248082220200	1	0.008	0.008
320132084004303	1	0.008	0.008
372323120481700	5	0.0981	0.08188
372829120420801	7	0.152	0.084271429
372839120413901	19	0.166	0.078010526
373012120393401	4	0.423	0.34675
373020120385201	1	0.0298	0.0298
373112120382901	23	0.507	0.241226087
373115120382801	26	0.079	0.033961538
374111121000301	1	0.124	0.124
374115120591601	1	0.176	0.176
393557105033101	2	0.008	0.0074
393613104511401	2	0.015	0.0115
393944084120700	18	0.131	0.016311111
393948105053501	6	0.008	0.008
394107105021001	2	0.008	0.008
394340085524601	75	0.033	0.008845333
394409105020501	6	0.008	0.008
394553105075101	2	0.008	0.008
394629105063101	2	0.01	0.009
394919105074601	6	0.008	0.007566667
394921105015701	6	0.008	0.008
395324105035001	2	0.008	0.008
395554105085601	2	0.13	0.0725
395707105100401	2	0.008	0.008
395743086030501	29	0.008	0.008
395958105113501	2	0.008	0.008
400000105125400	2	0.008	0.008
400023105142301	2	0.008	0.008
400217105123701	6	0.008	0.008
400607105094401	2	0.008	0.008
400810105071301	2	0.008	0.008
400855105090501	6	0.008	0.008
400925105023201	2	0.0099	0.00895
402549105043101	2	0.008	0.008
403035105035301	2	0.008	0.008
403048105042701	6	0.008	0.008
403308105001601	6	0.008	0.008
403356105024001	2	0.008	0.008
404200105145600	17	0.008	0.008
434745123040200	2	0.008	0.008
435212122483300	2	0.008	0.008
440257123103200	2	0.008	0.008
443326123165200	2	0.008	0.008
445029122592600	2	0.008	0.008
445551123015800	6	0.008	0.008
450022123012400	6	0.008	0.008
451734122585400	2	0.008	0.008
452149123194900	2	0.008	0.008

USGS Station ID	Count	Maximum	Average
452231122200000	6	0.008	0.008
452337122243500	6	0.045	0.02305
452414122213200	6	0.06	0.023683333
452526122364400	7	0.008	0.008
452912122291200	2	0.008	0.008
453506123125700	2	0.008	0.008
454321122352300	2	0.008	0.00605
454510122424900	6	0.008	0.008
454543122524900	2	0.008	0.008
454549122295800	6	0.008	0.008
455122122310600	6	0.008	0.008
462023120075200	65	0.0296	0.008101538
462023120075240	9	0.0194	0.008722222

Appendix D: Ecological Effects

1. Aquatic Effects Characterization

a. Aquatic Animals

(1) Acute Effects

Freshwater Fish and Aquatic-Phase Amphibians

Freshwater Fish Acute Toxicity Data					
Common Name	**%AI**	**Study parameters**	**LC_{50}/NOAEC/LOAEC**	**MRID**	**Classification/ Category**
Bluegill sunfish *Lepomis macrochirus*	84.5	96 hour study 10 fish/vessel 0, 0(solvent), 0.84, 1.5, 2.7, 4.7, 8.4 mg/L Static study	96 HR LC_{50}=**2.4 (1.5-4.7) mg/L**[2]. NOAEC = 1.5 mg/L LOAEC = 2.7 mg/L based on quiescence, loss of equilibrium and death.	00144285	Core Moderately toxic[1]
Rainbow trout *Onchorhynchus mykiss*	84.5	96 hour study 10 fish/vessel 0, 0(solvent), 1.0, 1.8, 3.2, 5.6, 10 mg/L Static study	96 HR LC_{50}=4.2 (3.2-5.6) mg/L NOAEC = 1.8 mg/L LOAEC = 3.2 mg/L (loss of equilibrium, surfacing and dark coloration). Mortality observed at 5.6 mg/L and above.	00141677	Core Moderately toxic[1]

[1]Based on LC_{50} (mg/L): < 0.1 very highly toxic; 0.1-1 highly toxic; >1-10 moderately toxic; >10-100 slightly toxic; >100 practically nontoxic

[2] **Bold** value is the value that will be used to calculate risk quotients

Look at 13-day frog study in ECOTOX

Freshwater Invertebrates

Freshwater Invertebrates Acute Toxicity Data					
Common Name	**%AI**	**Study parameters**	**EC_{50}/NOAEC/LOAEC**	**MRID**	**Classification/ Category**
Water flea *Daphnia magna*	84.5	48 hour study 20 inverts/conc. level 0, 0(solvent), 1.8, 3.2, 5.6, 10, 18 mg/L Static study	48 HR EC_{50} =**11 (9.5-13) mg/L**[2]. Slope = 6.83 (4.1 – 9.6) NOAEC = 10 mg/L LOAEC = 5.6 mg/L (settled to the bottom). Mortality observed at 10 mg/L and above.	00141678	Core Slightly toxic[1]

Freshwater Invertebrates Acute Toxicity Data					
Common Name	**%AI**	**Study parameters**	**EC_{50}/NOAEC/LOAEC**	**MRID**	**Classification/ Category**

[1]Based on EC_{50} (mg/L): < 0.1 very highly toxic; 0.1-1 highly toxic; >1-10 moderately toxic; >10-100 slightly toxic; >100 practically nontoxic

[2] **Bold** value is the value that will be used to calculate risk quotients

Marine/Estuarine Fish

Estuarine/Marine Fish Acute Toxicity Data					
Common Name	**%AI**	**Study parameters**	**LC_{50}/NOAEC/LOAEC**	**MRID**	**Classification/ Category**
Sheepshead minnow *Cyprinodon variegatus*	93	96-hour study 20 fish/conc. Level 0, 0(solvent), 1.2, 1.8, 2.3, 3.8, 6.3 mg/L (mean measured) Flow-through study	96 HR LC_{50} =**4.7 (3.8-6.3) mg/L**[2]. NOAEC = 1.2 mg/L LOAEC = 1.8 mg/L (errative hebanior, darkened pigmentation, lethargy; fish at higher concentration levels also exhibited partial loss of equilibrium and rapid respiration). Mortality observed at 3.8 mg/L and above.	42747903	Core Moderately toxic[1]

[1]Based on LC_{50} (mg/L): < 0.1 very highly toxic; 0.1-1 highly toxic; >1-10 moderately toxic; >10-100 slightly toxic; >100 practically nontoxic

[2] **Bold** value is the value that will be used to calculate risk quotients

Marine/Estuarine Invertebrates

Estuarine/Marine Invertebrate Acute Toxicity Data					
Common Name	**%AI**	**Study parameters**	**EC_{50}/NOAEC/LOAEC**	**MRID**	**Classification /Category**
Eastern oyster *Crassostrea virginica*	93	96-hour study 40 oysters/conc. level 0, 0(solvent), 0.091, 0.16, 0.29, 0.48, 0.78 mg/L (mean measured) Flow-through study	96 HR EC_{50} =**0.68 0.64-0.73) mg/L**[2]. Slope = 2.09 (-0.8 – 5.0) NOAEC = 0.48 mg/L LOAEC = 0.78 mg/L (shell deposition). Inadequate shell growth in controls may mask pesticide related shell growth effects.	42747901	Supplemental Highly toxic[1]

Estuarine/Marine Invertebrate Acute Toxicity Data					
Common Name	**%AI**	**Study parameters**	**EC_{50}/NOAEC/LOAEC**	**MRID**	**Classification /Category**
Mysid *Mysidopsis bahia*	93	Two 96-hour studies 20 mysids/conc. Level 0, 0 (solvent), 180, 260, 410, 550, 1000 µg/L (first study); 0, 0 (solvent), 34, 43, 78, 110, 200 µg/L (second study) (mean measured) Flow-through study	96-HR LC_{50} = **0.24 (0.20 – 0.27) mg/L.** Slope = 6.4 Precise LC_{50} could not be determined in second study NOAEC could not be determined in first study. NOAEC = 0.043 mg/L from second study LOAEC = 0.078 mg/L (mortality; sublethal effects observed at levels where mortality was observed – lethargy, darkened pigmentation).	42747902	Core Highly toxic

[1]Based on EC_{50} (mg/L): < 0.1 very highly toxic; 0.1-1 highly toxic; >1-10 moderately toxic; >10-100 slightly toxic; >100 practically nontoxic

[2] **Bold** value is the value that will be used to calculate risk quotients

(2) Chronic Effects

Freshwater Fish

Freshwater Fish ChronicToxicity Data					
Common Name	**%AI**	**Study parameters**	**NOAEC/LOAEC**	**MRID**	**Classification /Category**
Fathead minnow *Pimephales promelas*		Early life stage 0, 0 (solvent), 0.45, 0.98, 2.2, 4, 8.5 mg/L tested	**0.98 mg/L**[1] Early life LOAEC=2.2 mg/L 2.2 < MATC < 4 mg/L. Total mortality at 8.5 mg/L.	00164986 40409201 40480401	Core

[1] **Bold** value is the value that will be used to calculate risk quotients

Freshwater Invertebrates

There are currently no chronic freshwater invertebrate studies available for myclobutanil.

Estuarine/Marine Fish

There are currently no chronic estuarine/marine fish studies available for myclobutanil.

Estuarine/Marine Invertebrates

There are currently no chronic estuarine/marine invertebrate studies available for myclobutanil.

(3) Field Studies

There are currently no aquatic field studies available for myclobutanil.

b. Aquatic Plants

Aquatic Plant Toxicity Data					
Common Name	**%AI**	**Toxicity**	**NOAEC**	**MRID**	**Classification /Category**
Freshwater green algae Tier II reproduction *Selenastrum capricornutum*	100	120-hour EC_{50} **0.83 mg/L**[1] (0.56-1.1). Mean measured concentrations tested: 0, 0 (solvent), 0.56, 1.1, 2.2, 5.1, 6.6 mg/L	120-hour NOAEC = 0.56 mg/L LOAEC = 1.1 mg/L (cell density)	419848-01	Core

[1] **Bold** value is the value that will be used to calculate risk quotients

2. Terrestrial Effects Characterization

a. Terrestrial Animals

(1) Acute Effects

Birds

Avian Acute Toxicity Data					
Common Name	**%AI**	**Study parameters**	**LD_{50}/LC_{50} NOAEL/ LOAEL**	**MRID**	**Classification /Category**
Bobwhite Quail *Colinus virginianus*	84.5	Acute oral study 10 birds/dose level 21 day observation period 0 (vehicle), 316, 464, 681, 1000, 1470 mg/kg tested	LD_{50} **498 (408 – 598) mg/kg bw**[3] Slope = 7.03 (3.5-10.5) NOAEL not determined LOAEL 316 mg/kg (lethargy and anorexia). Mortalities at all dose levels (1, 4, 8, 10 and 10, respectively). Good dose response; NOAEL not critical in this case.	00144286	Core Slightly toxic[1]
Bobwhite Quail *Colinus virginianus*	84.5	Subacute dietary study 10 birds/concentration level 5 days on treatment, 3 days observation 0 (vehicle), 246, 641, 1150, 3000, 4530 ppm tested (measured concentrations)	LC_{50} **>4530 ppm** NOAEC: 1150 ppm LOAEC: 3000 ppm Mortality: 2 at 3000 ppm and 1 at 4530 ppm. Anorexia and lethargy at 3000 and 4530 ppm	00144287	Core Slightly toxic[2]
Mallard Duck *Anas platyrhynchos*	84.5	Subacute dietary study 10 birds/concentration level 5 days on treatment, 3 days observation 0 (vehicle), 270, 620, 1250, 2220, 4090 ppm tested (measured concentrations)	LC_{50} >4090 ppm NOAEC: 1250 ppm LOAEC: 2220 ppm (anorexia and lethargy). One bird died at 4090 ppm.	00144287	Core Slightly toxic[2]

[1] Based on LD_{50} (mg/kg) <10 very highly toxic; 10-50 highly toxic; 51-500 moderately toxic; 501-2000 slightly toxic; >2000 practically nontoxic

[2] Based on LC_{50} (mg/kg) <50 very highly toxic; 50-500 highly toxic; 501-1000 moderately toxic; 1001-5000 slightly toxic; >5000 practically nontoxic

[3] **Bold** value is the value that will be used to calculate risk quotients

Mammals

Mammalian Acute Toxicity Data					
Common Name	**%AI**	Study parameters	**LD_{50} NOAEL**	**MRID**	**Classification /Category**

Mammalian Acute Toxicity Data					
Common Name	**%AI**	Study parameters	**LD_{50} NOAEL**	**MRID**	**Classification /Category**
Laboratory rat *Rattus norvegicus*	91.9	Acute oral study 0, 1.3, 2.0, 3.2, 5.0 g/kg bw tested 10/dose level 14-day observation period	Acute oral LD_{50}=1.36 g/kg bw This study was conducted on female mice (original DER mistakenly stated that it was in the rat). Mortality at all dose levels tested. Multiple clinical signs, including ataxia, tremors, loss of righting and others – not dose-related; however, early deaths may have affected reporting. HED used rat values 1.6 (M) and 2.29 (F) g/kg bw	00165239 00141662	Core Slightly toxic[1]

[1] Based on LD_{50} (mg/kg) <10 very highly toxic; 10-50 highly toxic; 51-500 moderately toxic; 501-2000 slightly toxic; >2000 practically nontoxic

[2] **Bold** value is the value that will be used to calculate risk quotients

Terrestrial Invertebrates

Data on honey bees are available (MRID 00144289); however, a review of the study is not available. These data indicate that myclobutanil (81.1%) technical is not toxic to honey bees at a dosage of 100µg/bee. The bees were exposed to a finished dust containing 27.58% a.i. in a bell jar vacuum duster at dosages of approximately 120, 240 or 362 µg technical material per bee. Observations for clinical signs of toxicity were made daily for 96 hours.

Look at earthworm study in ECOTOX

(2) Chronic Effects

Birds

Avian Chronic Toxicity Data					
Common Name	**%AI**	**Study Parameters**	**NOAEC/LOAEC**	**MRID**	**Classification /Category**
Bobwhite Quail *Colinus virginianus*	94.2	Reproduction study Mean measured concentrations: 0 (vehicle), 72.5, 124.2, 181.8, 255.8 ppm 16 pairs per concentration level	NOAEC = **256 ppm**[1] LOAEC >256 ppm No treatment-related effects at any level. Not tested at sufficiently high concentration levels	43087901	Supplemental

Avian Chronic Toxicity Data					
Common Name	**%AI**	**Study Parameters**	**NOAEC/LOAEC**	**MRID**	**Classification /Category**
Mallard Duck *Anas platyrhynchos*	94.2	Reproduction study Mean measured concentrations: 0 (vehicle), 72.5, 124.2, 181.8, 255.8 ppm 16 pairs per concentration level	NOAEC = 256 ppm LOAEC >256 ppm No treatment-related effects at any level. Not tested at sufficiently high concentration levels	43087902	Supplemental

[1] **Bold** value is the value that will be used to calculate risk quotients

Mammals

Mammalian Chronic Toxicity Data					
Common Name	**%AI**	**Study Parameters**	**NOAEC/ LOAEC**	**MRID**	**Classification/ Category**
Laboratory rat *Rattus norvegicus*	84.5	2-Generation reproduction study 25 rats/sex/group 0, 50, 200 or 1000 ppm 4, 16 or 80 mg/kg bw/day based on overall mean concentration of active ingredient in dietary analyses (HED document 004936; HED records center file R050631).	**NOAEC = 200 ppm** **NOAEL = 16 mg/kg/day** LOAEC=1000 ppm LOAEL = 80 mg/kg/day (testicular, epididymal and prostatic atrophy in P2 males; slight increase in stillborns, decrease in body weight gain in pups during lactation in F1 and F2 generations)	00149581 00143766	Core

[1] **Bold** value is the value that will be used to calculate risk quotients

RH-53,866 (technical myclobutanil, 84.5% pure) was tested in a 2-generation reproduction study with male and female CRL:CD(SD)BR rats. The rats were obtained from Charles River Breeding Laboratories, Kingston Facility, Stone Ridge, NY. Twenty-five animals/sex/dose group received 0, 50, 200 or 1000 ppm in the diet throughout the study (0, 2.5, 10 or 50 mg/kg/day by standard conversion factor). The animals were mated on a one to one ratio with the F_0 parental animals and were given test diets for 8 weeks before they were mated. Selection of the parents for the F_1 generation was made when the pups were 25 days of age, and the mated animals in the study were approximately 81 days of age at mating.

At 200 ppm, centrilobular hepatocellular hypertrophy was observed in the P_2 males. This was supported by slight but statistically significant increases in liver weights in males:

(114% absolute, 107% relative for P_1 and 107% absolute and 104% relative for P_2). At 1000 ppm, centrilobular hepatocellular hypertrophy was observed in both sexes in the P_1 and P_2 generations. These were again supported by slight but statistically significant increases in liver weights: males: (113.6% absolute, 114% relative for P_1; 107% absolute, 113% relative for P_2); females: (109% absolute, 109% relative for P_1; 106% absolute, 108% relative for P_2). Therefore, **the parental (systemic) toxicity LOEL is 200 ppm and the parental (systemic) toxicity NOEL is 50 ppm** based on hepatocellular hypertrophy and increases in liver weights.

At 1000 ppm, an increase in the number of stillborn or % born dead was observed in both generations (4.9 - 5.3% versus 0 - 1.9% in controls). In addition, multifocal or diffuse testicular atrophy was observed in males in the P_2 generation. Increased necrotic spermatocytes/spermatids or decreased spermatozoa and atrophy of the prostate were also observed in these animals. Therefore, **the reproductive toxicity LOEL is 1000 ppm and the reproductive toxicity NOEL is 200 ppm** based on an increased incidence in the number of stillborns and atrophy of the testes and prostate.

At 1000 ppm, it appears that there was a decrease in pup weight gain during lactation (83.3% to 89.7% of the controls). Therefore, the **developmental toxicity LOEL is 1000 ppm and the developmental toxicity NOEL is 200 ppm** based on a decrease in pup body weight gain during lactation.

This study is classified as Core Guideline.

Degradate: 1,2,4-triazole – developmental and reproduction data exist. There is evidence of developmental toxicity in available studies in rats and rabbits. In rats, reduced fetal body weight, an increased incidence of runts, an increase in skeletal variations and an increase in incidence of undescended testes were seen at the LOAEL of 100 mg/kg/day, a dose also causing decreased body weight gain in dams. At 200 mg/kg/day in rats, there was an increase in malformations, including cleft palate and hydronephrosis, accompanied by an increase in post-implantation loss. In rabbits, there was a decrease in fetal weight and an increase in incidence of urinary tract malformations at doses causing severe effects in does (weight loss, multiple clinical signs, and increased mortality). The dose-response in rabbits appears to be very steep, with no effects seen at 30 mg/kg/day, and mortality seen at 45 mg/kg/day (only 15 mg/kg/day higher). In summary, there was no increase in quantitative severity in either species. There was an increase in qualitative sensitivity (more severe effects) in rats, but not in rabbits.

TABLE X Toxicity Profile of 1,2,4 triazole as it relates to potential reproductive effects

Gdln	Study Type/ *Classification*	*MRID Number*	*Doses*	*Results*
870.3050	*28-Day oral toxicity in mice Acceptable/ non-guideline*	46467301	0, 50,250, 500, 2000 ppm **M:** 9, 47, 90, 356 mkd **F:** 12, 60, 120, 479 mkd	**NOAEL:** 90 mg/kg/day **LOAEL:** 356 mg/kg/day (male) based on testicular degeneration

TABLE X Toxicity Profile of 1,2,4 triazole as it relates to potential reproductive effects				
Gdln	Study Type/ *Classification*	*MRID Number*	*Doses*	*Results*
870.3100	90-Day oral toxicity in mice *Acceptable/ guideline*	46467302	0, 500, 1000, 3000, 6000 ppm **M:** 80, 161, 487, 988 mkd **F:** 105, 215, 663, 1346 mkd	**NOAEL:** 80 mg/kg/day **LOAEL:** 161 mg/kg/day based on ↓testicular wt and microscopic testicular changes At 487 mg/kg/day, also tremors, ↓brain wt, slight hematology changes. At 988 mg/kg/day, also cerebellar degeneration.
870.3700	Developmental toxicity in rats *Acceptable/ guideline*	45223401 45223402	0, 100, 200 mg/kg/day 0, 10, 30, 100 mg/kg/day	**Maternal NOAEL:** 30 mg/kg/day **Maternal LOAEL**: 100 mg/kg/day based on ↓BW gain **Developmental NOAEL**: 30 mg/kg/day **Developmental LOAEL:** 100 mg/kg/day based on ↓fetal BW, skeletal variations, undescended testes Also at 200, increased resorptions and decreased number of viable fetuses, cleft palate, hydronephrosis, increased incidence of major malformations
870.3700	Developmental toxicity in rabbits *Acceptable/ guideline*	46492903	0, 5, 15, 30, 45 mg/kg/day	**Maternal NOAEL:** 30 mg/kg/day **Maternal LOAEL**: 45 mg/kg/day based on mortality and clinical signs (↓motor activity, head tilt, lacrimation, drooping eyelids, diarrhea, salivation) **Developmental NOAEL**: 30 mg/kg/day **Developmental LOAEL:** 45 mg/kg/day based on ↓fetal wt and urinary tract malformations
870.3800	Reproduction and fertility effects *Acceptable*	46467304	0, 250, 500, 3000 ppm **M:** 15, 31, 189 mkd **F:** 18, 36, 218 mkd	**Parental NOAEL:** <15 mg/kg/day **Parental LOAEL**: 15 mg/kg/day (male) based on ↓BW and BWG in F1 males, ↓spleen weight in F1 females At 218 mg/kg/day: cerebellar lesions, ↓brain weight, ↓thyroid weight, **Offspring NOAEL:** <19 mg/kg/day **Offspring LOAEL:** 19 mg/kg/day based on ↓BW, BWG and brain wt in F2 pups, ↓spleen weight in F2 female pups. **Repro NOAEL**: 15 mg/kg/day **Repro LOAEL**: 31 mg/kg/day based on abnormal sperm and ↓# of CL in F1 females At 218 mg/kg/day, reproductive failure (no viable offspring), ↑CL in F0 parental females

Developmental Toxicity Studies

There is evidence of developmental toxicity in available studies in rats and rabbits. In rats, reduced fetal body weight, an increased incidence of runts, an increase in skeletal variations and an increase in incidence of undescended testes were seen at the LOAEL of 100 mg/kg/day, a dose also causing decreased body weight gain in dams. At 200

mg/kg/day in rats, there was an increase in malformations, including cleft palate and hydronephrosis, accompanied by an increase in post-implantation loss. In rabbits, there was a decrease in fetal weight and an increase in incidence of urinary tract malformations at doses causing severe effects in does (weight loss, multiple clinical signs, and increased mortality). The dose-response in rabbits appears to be very steep, with no effects seen at 30 mg/kg/day, and mortality seen at 45 mg/kg/day (only 15 mg/kg/day higher). In summary, there was no increase in quantitative severity in either species. There was an increase in qualitative sensitivity (more severe effects) in rats, but not in rabbits.

Reproductive Toxicity Study

There is evidence of increased offspring sensitivity, both quantitative and qualitative, in the reproductive toxicity study in rats. In adult (F1) male offspring, decreases in body weight and brain weight were seen at doses of 15-16 mg/kg/day and 36 mg/kg/day, respectively. Similar effects were seen in parental (F0) animals only at the highest dose of 189 mg/kg/day. Similarly, decreased brain weight and body weight were seen at (parental) doses of 18.9 mg/kg/day in F2 pups, doses below those causing similar effects in F0 animals (189 mg/kg/day). Decreases in corpora lutea were seen in F1 females at 36 mg/kg/day; similar effects were not seen in F0 females (increases in corpora lutea were seen at the high dose of 218 mg/kg/day; no changes were seen in mid-dose F0 females).

(3) Field Studies

There are currently no terrestrial field studies available for myclobutanil.

b. Terrestrial Plants

There are currently no terrestrial plant studies available for myclobutanil.

Appendix E. The Risk Quotient Method And Levels of Concern

The risks to terrestrial and aquatic organisms are determined based on a method by which risk quotients (RQs) are compared with levels of concern (LOCs). This method provides an indication of a chemical's potential to cause an effect in the field from effects observed in laboratory studies, when used as directed. Risk quotients are expressed as the ratio of the estimated environmental concentration (EEC) to the species-specific toxicity reference value (TRV):

$$RQ = \frac{EEC}{TRV}$$

Units for EEC and TRV should be the same (e.g., μg/L or ppb). The RQ is compared to the LOC as part of a risk characterization. Acute and chronic LOCs for terrestrial and aquatic organisms are given in recent Agency guidance (EPA, 2004) and summarized in the table below.

Level of concern (LOC) by risk presumption category (U.S. EPA 2004).

Risk Presumption	RQ	LOC
	Mammals and Birds	
Acute Risk [a]	EEC[b]/LC_{50} or LD_{50}/sqft[c] or LD_{50}/day [d]	0.5
Acute Restricted Use [e]	EEC/LC_{50} or LD_{50}/sqft or LD_{50}/day (or LD_{50} <50 mg/kg)	0.2
Acute Endangered Species [f]	EEC/LC_{50} or LD_{50}/sqft or LD_{50}/day	0.1
Chronic Risk	EEC/NOAEC	1
	Aquatic Animals	
Acute Risk	EEC[g]/LC_{50} or EC_{50}	0.5
Acute Restricted Use	EEC/LC_{50} or EC_{50}	0.1
Acute Endangered Species	EEC/LC_{50} or EC_{50}	0.05
Chronic Risk	EEC/NOAEC	1
	Terrestrial and Semi-aquatic Plants	
Acute Risk	EEC/EC_{25}	1
Acute Endangered Species	EEC/EC_{05} or NOAEC	1
	Aquatic Plants	
Acute Risk	EEC[h]/EC_{50}	1
Acute Endangered Species	EEC[g]/EC_{05} or NOAEC	1

[a]Potential for acute toxicity for receptor species if RQ > LOC (EPA, 2004).
[b]Estimated environmental concentration (ppm) on avian/mammalian food items
[c]mg/ft^2
[d]mg of toxicant consumed per day
[e]Potential for acute toxicity for receptor species, even considering restricted use classification, if RQ > LOC (EPA, 2004).
[f]Potential for acute toxicity for endangered species of receptor species if RQ > LOC (EPA, 2004).
[g]EEC = ppb or ppm in water
[h]EEC = lbs a.i./A

The LOCs are criteria used by OPP to indicate potential risk to non-target organisms and the need to consider regulatory action. The criteria indicate that a pesticide used as directed has the potential to cause adverse effects on non-target organisms. LOCs currently address the following risk presumption categories: (1) acute - potential for acute risk to non-listed species; regulatory action may be warranted in addition to restricted use classification, (2) acute restricted use - potential for acute risk to non-

listed species; however, risk may be mitigated through restricted use classification, (3) acute endangered species - potential for acute risk to endangered species; regulatory action may be warranted, and (4) chronic risk - potential for chronic risk; regulatory action may be warranted. Currently, due to lack of modeling applications, EFED does not perform assessments for chronic risk to plants, acute or chronic risks to non-target insects or chronic risk from granular/bait formulations to mammalian or avian species.

For acute studies on taxa where no effects were observed at any concentration level, the RQs are not calculated and a qualitative discussion is provided in the Risk Description section. For acute studies on taxa where an LC_{50}/LD_{50} is not established due to insufficient mortality but some mortality was observed in the study, again, the RQs are not calculated and the study is discussed further in the Risk Description section.

The ecotoxicity test values (i.e., measurement endpoints) used in the acute and chronic risk quotients are derived from the results of required studies. Examples of ecotoxicity values derived from the results of short-term laboratory studies that assess acute effects are: (1) LC_{50} (fish) (2) LD_{50} (birds and mammals) (3) EC_{50} (aquatic plants and aquatic invertebrates) and (4) EC_{25} (terrestrial plants). An example of a toxicity test effect level derived from the results of long-term laboratory study that assesses chronic effects is: NOAEC (No Observed Adverse Effect Level; birds, fish and aquatic invertebrates).

Appendix F:
Incidence Summary Reports

Back to Main Menu | Print | Go to Part B

EIIS Pesticide Report

Part A: General Information

Pesticide: **Myclobutanil**

P.C. Code: **128857**

Incident #	Treatment Site	Date	County	State	Certainty	Legality	Formulation	Appl. Method	Magnitude
PLANTS									*Count:* 3
I002621-006	Grape	5/30/1994		CA	2	RU		Spray	ALL
I013563-014	Grape	6/2/2000	Fresno	CA	2	RU		Spray	6 acres
I014702-074	Nursery	6/16/2003	Cecil	MD	2	UN	Wettable powder	Broadcast	200 houses

Total Number of Incidents **3**

Certainty Index: 0=Unrelated, 1=Unlikely, 2=Possible, 3=Probable, 4=Highly Probable
Legality: RU=Registered Use, MA=Misuse (accidental), MI=Misuse (intentioanl), UN=Undetermined

Back to Main Menu | Print | Go to Part A

EIIS Pesticide Report

Part B: Effects Information

Pesticide: **Myclobutanil**

P.C. Code: **128857**

Incident #	Date	State	Species	Response	Route Exposed	Magnitude for Species	Residue Analysis
PLANTS							
I002621-006	5/30/1994	CA	Grape	Incapacitation			No
I013563-014	6/2/2000	CA	Grape	Plant damage	Treated directly	6 acres	No
I014702-074	6/16/2003	MD	ROSE BUSHES	Plant damage	Treated directly	200 houses	No

Three incidence reports were filed for myclobutanil between 1994 and 2003, all with effects on terrestrial plants (two incidences with grapes and one with roses). The two incidences with grapes occurred in California and the one with roses was reported in Maryland. The certainty index for the damage in all 3 incidences was rated as possibly related to exposure to myclobutanil. The two incidences with grapes involved application of other pesticides as well as the myclobutanil. Therefore, it is not definitively known whether or not the effects were due to exposure to myclobutanil in these two incidences. Myclobutanil was the only pesticide applied to the rose bushes in the third reported incidence.

Incident 1: Rally 40W (myclobutanil), Pro Gibb (gibberellic acid), dimethogan 25 WP, Pro Kil Cryolite 96 (sodium fluoaluminate), Britz binder and Booster 42 Foliar Spray (polymeric polyhydroxy acids) were applied by ground application to grape vines. Shortly after the last application, scarring of the berries, stunted vine growth, lack of berry size increase, dieback of fruit from total bunches and limited cone growth with straggly branches were observed. No residue analysis was conducted. The California Commissioner's report indicated that mixtures of Pro-Gibb 4% and Pro-Kil Cryolite 96 may cause some compatibility problems. No specific data on terrestrial plants were found in the Agency files for any of the pesticides applied on this incident.

Incident 2: It was reported that Rally 40W damaged 6 acres of Red Globe and Thompson's grapes to the point that they could not be sold. Burns and necrosis on bunches (Red Globe) and leaf burn (Thompson's) were observed. Agri-MEK (abamectin) and Ad-Wet were also applied, using a ground spray on the vineyard. Again, no specific data on terrestrial plants were found in the Agency files for any of the pesticides applied on this incident.

Incident 3: Systhane (myclobutanil) was applied via a broadcast spray to rose bushes grown in greenhouses by local residents in Maryland. The total magnitude was 200 houses. Foliar necrosis and some defoliation were observed after exposure to systhane. Damage varied from house to house and by rose variety.

Appendix G. Terrestrial Risk Quotients T-REX Model (Version 1.3.1, July 7, 2007)

This spreadsheet-based model calculates the residues on avian and mammalian food items along with the dissipation rate of a chemical applied to foliar surfaces (for single or multiple applications) in order to estimate acute and reproductive risk quotients. The results are presented by weight class for various sized birds and mammals for each type of application.

T-REX uses the same principle as the batch code models FATE and TERREEC that calculate terrestrial exposure concentration estimates on plant surfaces following pesticide application. However, T-REX performs a number of calculations that neither FATE nor TERREEC perform. For example, T-REX adjusts acute and chronic toxicity values based on the relative body weight of the animal being assessed compared with the animal used in the toxicity studies. T-REX also calculates risk quotients for granular applications and seed treatments.

Risk Estimation Based on Dietary Residue Concentrations (Foliar Spray)

The methods used by T-REX to estimate risk from consumption of selected contaminated food items is described below. For this analysis, T-REX calculates EECs and risk quotients based on both the upper bound and mean residue concentrations as presented by Hoerger and Kenaga (1972) and modified by Fletcher et al. (1994). These concentrations are determined using nomograms that relate application rate of a pesticide to residues remaining on dietary items of terrestrial organisms. The results of the upper bound and mean residue levels are presented in separate tabs ("upper bound Kenaga" and "mean Kenaga"); however, the methods used to calculate EECs and risk quotients are equivalent. **Only RQs from the upper bound Kenaga worksheet are to be used for comparison to levels of concern in the assessment.** The mean residues, and the RQs generated from them, presented in the mean Kenaga worksheet are to be used only for risk description. Replacing the upper bound residues with the mean residues is not a valid mitigation approach when upper bound residues result in LOC exceedances. Based on the estimated dietary residue concentrations from the upper bound and mean Kenaga values, T-REX calculates the associated doses for various size classes of birds and mammals. Both the dietary concentration (mg/kg-dietary item) and the resulting estimated doses (mg/kg-bw) may be used for risk estimation. The resulting dietary based and concentration based risk quotients are discussed below.

This section describes how T-REX estimates the following: (1) residue concentrations on selected food items (mg/kg-dietary item); (2) dose-based EECs (mg/kg-bw) from dietary concentrations on selected food items; (3) adjusted toxicity values; and (4) risk quotients.

Calculation of Dietary Concentrations on Selected Food Items

The spreadsheet calculates the pesticide residue concentrations on each selected food item on a daily interval for one year. When multiple applications are modeled, residue concentrations resulting from the final application and remaining residue from previous applications are summed. The maximum concentration calculated out of the 365 days is returned as the EEC used to estimate potential risk to birds and mammals as described

below. Dissipation of a chemical applied to foliar surfaces for single or multiple applications is calculated assuming a first order decay rate from the following first order rate equation:

$$CT = C_i e^{-kT}$$

or in log form:

$$\ln (CT/C_i) = kT$$

Where

CT = concentration at time T = day zero.

C_i = concentration, in parts per million (PPM), present initially (on day zero) on the surfaces. C_i is calculated by multiplying the application rate, in pounds active ingredient per acre, by 240 for short grass, 110 for tall grass, and 135 for broad-leafed plants/small insects and 15 for fruits/pods/large insects based on the Kenaga nomogram (Hoerger and Kenaga, 1972) as modified by Fletcher (1994). For maximum concentrations, additional applications are converted from pounds active ingredient per acre to PPM on the plant surface and the additional mass added to the mass of the chemical still present on the surfaces on the day of application.

k = If the foliar dissipation data submitted to EFED are found scientifically valid and statistically robust for a specific pesticide, the 90% upper confidence limit of the mean half-lives should be used. When scientifically valid, statistically robust data are not available, EFED recommends using a default half-life value of 35 days. The use of the 35-day half-life is based on the highest reported value (36.9 days), as reported by Willis and McDowell (Pesticide persistence on foliage, Environ. Contam. Toxicol, 100:23-73, 1987).

T = time, in days, since the start of the simulation. The initial application is on day 0. The simulation is designed to run for 365 days.

The dietary concentrations estimated using the above methodology may be used directly to calculate risk quotients, but may also be used to calculate dose-based EECs (mg/kg-bw) for various size classes of mammals and birds as below.

Calculating EEC Equivalent Doses based on Estimated Dietary Concentrations on Selected Bird and Mammal Food Items

EECs (mg/kg-bw) for various size classes of mammals and birds may be calculated based on the dietary residue concentrations derived using the equations presented above. To allow for this type of analysis, the EECs and toxicity values are adjusted based on food intake and body weight differences so that they are comparable for a given weight class of animal. The size classes assessed are small (20-gram), medium (100-gram), and large (1000-gram) birds, and small (15-gram), medium (35-gram), and large (1000-gram) mammals. Equations used

to calculate food intake (grams/day) and to adjust toxicity values for dose-based risk quotients are presented below.

Calculating Food Intake for Different Size Classes of Birds and Mammals:

Daily food intake (g/day) is assumed to correlate with body weight using the following empirically derived equation (U.S. EPA, 1993): Avian consumption

where:

F = food intake in grams of fresh weight per day (g/day)
BW = body mass of animal (g)
W = mass fraction of water in the food (EFED value = 0.8 for birds and herbivorous mammals, 0.1 for granivorous mammals)

Based on this equation, a 20-gram bird would consume 22.8 grams of food daily (114% of its body weight), a 100-gram bird would consume 65 grams of food daily (65% of its body weight daily), and 1000-gram bird would consume 290 grams of food daily (29% of its body weight). These data, together with the residue concentrations (mg/kg-food item) on selected food items calculated from the Kenaga nomogram, are used to estimate the dose (mg/kg-bw) of residue consumed by the three size classes of birds as discussed below. Using a small (20-gram) bird as an example, a dietary concentration of 100 mg/kg-diet (ppm) x 1.14 kg diet/kg bw (114%) would result in an equivalent dose-based EEC of 114 mg/kg-bw. T-REX calculates food intake based on dry weight and wet weight of food items. The dose-based assessment uses the wet weight food consumption values by assuming that dietary items are 80% water by weight. However, if dietary items of a species being assessed are known, then a refined dose-based EEC can be calculated using appropriate water fractions of the food items.

A similar relationship between body weight and food intake has been derived for mammals (U.S. EPA 1993):

Mammalian food consumption

(g/day)

where:

F = food intake in grams of fresh weight per day (g/day)
BW = body mass of animal (g)
W = mass fraction of water in the food (EFED value = 0.8 for birds and herbivorous mammals, 0.1 for granivorous mammals)

The scaling factors result in a percent body weight consumed presented in the following table for each weight class of mammal. These values are used in the same manner described for birds to calculate dose-based EECs (mg/kg-bw). Note the difference in food intake of grainivores compared with herbivores and insectivores. This is caused by the difference in the assumed mass fraction of water in their diets.

Table G1. Scaling factors and percent body weight consumed for 3 weight classes of mammals

Organism and Body Weight	Food Intake (g day $^{-1}$) [a]	Percent Body Weight Consumed (day $^{-1}$) [a]
15 g	14.3 / 3.2	95 / 21
35 g	23 / 5.1	66 / 15
1000 g	150 / 34	15 / 3

[a] The first number in this column is specific to herbivores/insectivores. The second number is for granivores. These groups have markedly different consumption requirements.

T-REX calculates food intake based on dry weight and wet weight of food items (wet weight is used for RQ calculations). The dose-based assessment uses the wet weight food consumption values by assuming that dietary items are 80% water by weight (10% for granivores). However, if dietary items of a species being assessed are known, then a refined dose-based EEC can be calculated using appropriate water fractions of the food items.

Calculating Adjusted Toxicity Values

The dose-based EECs (mg/kg-bw) derived above are compared with LD_{50} or NOAEL (mg/kg-bw) values from acceptable or supplemental toxicity studies that are adjusted for the size of the animal tested compared with the size of the animal being assessed (e.g., 20-gram bird). These exposure values are presented as mass of pesticide consumed per kg body weight of the animal being assessed (mg/kg-bw). EECs and toxicity values are relative to the animal's body weight (mg residue/kg bw) because consumption of the same mass of pesticide residue results in a higher body burden in smaller animals compared with larger animals. For birds, only acute values (LD_{50}s) are adjusted because dose-based risk quotients

are not calculated for the chronic risk estimation. Adjusted mammalian LD_{50}s and reproduction NOAELs (mg/kg-bw) are used to calculate dose-based acute and chronic risk quotients for 15-, 35-, and 1000-gram mammals. The following equations are used for the adjustment (U.S. EPA 1993):

Adjusted avian LD_{50}:

$$Adj.LD_{50} = LD_{50}\left(\frac{AW}{TW}\right)^{(x-1)}$$

where:

Adj. LD_{50} = adjusted LD_{50} (mg/kg-bw) calculated by the equation
LD_{50} = endpoint reported from bird study (mg/kg-bw)
TW = body weight of tested animal (178g bobwhite; 1580g mallard; 350g rat)
AW = body weight of assessed animal (*avian*: 20g, 100g, and 1000g)
x = Mineau scaling factor for birds; EFED default 1.15

Adjusted mammalian NOAELs and LD_{50}s (note that the same equation is used to adjust the NOAEL):

$$Adj.NOAEL\ or\ LD_{50} = NOAEL\ or\ LD_{50}\left(\frac{TW}{AW}\right)^{(0.25)}$$

where:

Adj. NOAEL or LD_{50} = adjusted NOAEL or LD_{50} (mg/kg-bw)
NOAEL or LD_{50} = endpoint reported from bird study (mg/kg-bw)
TW = body weight of tested animal (350g rat)
AW = body weight of assessed animal (15g, 35g, 1000g)

In this case, an acute mouse study was used for the endpoint selection. The LD_{50} from the mouse study was converted to an LD_{50} for the rat study prior to utilizing the study in T-REX. The LD_{50} for the mouse study is 1360 mg/kg. Using the equation provided above, the conversion for T-REX is as follows:

$1360 \times (20/350)^{0.25} = 1360 \times 0.49 = 665$ mg/kg .

Calculating Risk Quotients

Two types of risk quotients are calculated by T-REX based on the estimated dietary residue concentrations determined from the Kenaga nomogram: (1) dietary based RQs; and (2) dose based RQs. These RQs are not equivalent. Dietary risk quotients are calculated by directly comparing the concentration of a pesticide administered (or estimated to be administered) to experimental animals in the diet in a toxicity study to the concentration estimated to be on selected food items. These risk quotients do not account for the fact that smaller-sized animals need to consume more food relative to their body weight than larger animals or that differential amounts of food are consumed depending on the water content and nutritive value of the food. The dose-based risk quotients do account for these factors. The dose-based RQs incorporate the ingestion rate-adjusted exposure from the various food items to the different weight classes of birds and the weight class-scaled toxicity endpoints. Formulas presented in Table 2 are used to calculate dose-based and dietary based risk quotients:

Table G2. Formulas used to calculate dose- and dietary-based risk quotients

Duration	Dose or Dietary RQ	Surrogate Organism	Equation
Acute	Dose-based	Birds and mammals	Acute Daily Exposure (mg/kg-bw) / adjusted LD50 (mg/kg-bw)
	Dietary-based	Birds	Kenaga EEC (mg/kg-food item) / LC50 (mg/kg-diet)
Chronic	Dietary-based	Birds and mammals	EEC (mg/kg-food item) / NOAEC (mg/kg-diet)
	Dose-based	Mammals	EEC (mg/kg-bw) / Adjusted NOAEL (mg/kg-bw)

These risk quotients are compared to the Agency's LOCs to determine if risk is greater than EFED's concern level.

T-REX Model Input:

Table G3. Ecotoxicity Endpoints			
Avian	Bobwhite quail	LD_{50} (mg/kg-bw)	498
	Mallard duck	LC_{50} (mg/kg-diet)	4090
	Bobwhite quail	NOAEC (mg/kg-diet)	256
Mammals	Mouse LD_{50} (mg/kg-bw)		665
	NOAEL (mg/kg-bw)		16
	NOAEC (mg/kg-diet)		200

Table G-4. T-REX Tropical Fruits Rally 40WSP/Nova 40W 0.25 lbs/A; 8 applications/season Upper Bound Kenaga									
Acute Avian Dose-Based Risk Quotients									
Size Class (grams)	Adjusted LD50	EECs and RQs							
		Short Grass		Tall Grass		Broadleaf Plants/ Small Insects		Fruits/Pods/ Seeds/ Large Insects	
		EEC	RQ	EEC	RQ	EEC	RQ	EEC	RQ
20	358.77	251.50	**0.70**[1,2]	115.27	**0.32**	141.47	**0.39**	15.72	0.04
100	456.74	143.41	**0.31**	65.73	**0.14**	80.67	**0.18**	8.96	0.02
1000	645.16	64.21	**0.10**	29.43	0.05	36.12	0.06	4.01	0.01

[1]LOC for acute risk = 0.5, acute restricted use = 0.2, acute endangered species = 0.1
[2] **Bolded** values exceed LOC

Table G-5. Fruiting Vegetables and Other Crops Rally 40WSP/Nova 40W 0.125 lbs/A; 4 applications/season; 10-Day Interval Upper Bound Kenaga EECs									
Acute Avian Dose-Based Risk Quotients									
Size Class (grams)	Adjusted LD50	EECs and RQs							
		Short Grass		Tall Grass		Broadleaf Plants/ Small Insects		Fruits/Pods/ Seeds/ Large Insects	
		EEC	RQ	EEC	RQ	EEC	RQ	EEC	RQ
20	358.77	104.05	**0.29**[1,2]	47.69	**0.13**	58.53	**0.16**	6.50	0.02
100	456.74	59.33	**0.13**	27.19	0.06	33.38	0.07	3.71	0.01
1000	645.16	26.56	0.04	12.18	0.02	14.94	0.02	1.66	<0.01

[1]LOC for acute risk = 0.5, acute restricted use = 0.2, acute endangered species = 0.1
[2] **Bolded** values exceed LOC

Table G-6. Fruiting Vegetables and Other Crops Rally 40WSP/Nova 40W 0.125 lbs/A; 4 applications/season; 14-Day Interval Upper Bound Kenaga EECs					
Acute Avian Dose-Based Risk Quotients					
Size Class (grams)	Adjusted LD50	EECs and RQs			
		Short Grass	Tall Grass	Broadleaf Plants/ Small Insects	Fruits/Pods/ Seeds/ Large Insects

Table G-6. Fruiting Vegetables and Other Crops Rally 40WSP/Nova 40W 0.125 lbs/A; 4 applications/season; 14-Day Interval Upper Bound Kenaga EECs									
Acute Avian Dose-Based Risk Quotients									
		EEC	**RQ**	**EEC**	**RQ**	**EEC**	**RQ**	**EEC**	**RQ**
20	358.77	94.56	**0.26**[1,2]	43.34	**0.12**	53.19	**0.15**	5.91	0.02
100	456.74	53.92	**0.12**	24.71	0.05	30.33	0.07	3.37	0.01
1000	645.16	24.14	0.04	11.06	0.02	13.58	0.02	1.51	<0.01

[1]LOC for acute risk = 0.5, acute restricted use = 0.2, acute endangered species = 0.1
[2] **Bolded** values exceed LOC

Table G-7. Artichokes Rally 40WSP 0.1 lbs/A; 6 applications/season Upper Bound Kenaga EECs									
Acute Avian Dose-Based Risk Quotients									
Size Class (grams)	**Adjusted LD50**	**EECs and RQs**							
		Short Grass		**Tall Grass**		**Broadleaf Plants/ Small Insects**		**Fruits/Pods/ Seeds/ Large Insects**	
		EEC	**RQ**	**EEC**	**RQ**	**EEC**	**RQ**	**EEC**	**RQ**
20	358.77	91.50	**0.26**[1,2]	41.94	**0.12**	51.47	**0.14**	5.72	0.02
100	456.74	52.17	**0.11**	23.91	0.05	29.35	0.06	3.26	0.01
1000	645.16	23.36	0.04	10.71	0.02	13.14	0.02	1.46	<0.01

[1]LOC for acute risk = 0.5, acute restricted use = 0.2, acute endangered species = 0.1
[2] **Bolded** values exceed LOC

Mammals

Table G-8. T-REX Tropical Fruits Rally 40WSP/Nova 40W 0.25 lbs/A; 8 applications/season Upper Bound Kenaga											
Acute Mammalian Dose-Based Risk Quotients[1]											
Size Class (grams)	**Adjusted LD50**[2]	**EECs and RQs**									
		Short Grass		**Tall Grass**		**Broadleaf Plants/ Small Insects**		**Fruits/Pods/ Seeds/ Large Insects**		**Granivore**	
		EEC	**RQ**[1]	**EEC**	**RQ**	**EEC**	**RQ**	**EEC**	**RQ**	**EEC**	**RQ**
15	1461.56	210.54	**0.14**	96.50	0.07	118.43	0.08	13.16	0.01	2.92	<0.01
35	1182.56	145.51	**0.12**	66.69	0.06	81.85	0.07	9.09	0.01	2.02	<0.01
1000	511.49	33.74	0.07	15.46	0.03	18.98	0.04	2.11	<0.01	0.47	<0.01

[1]LOC for acute risk = 0.5, acute restricted use = 0.2, acute endangered species = 0.1
[2] LD_{50} based on acute toxicity study on the mouse, most sensitive species
[3] **Bolded** values exceed the LOC

Table G-9. Fruiting Vegetables and Other Crops 40WSP/Nova 40W 0.125 lbs/A; 4 applications/season; 10-Day Interval Upper Bound Kenaga EECs											
Acute Mammalian Dose-Based Risk Quotients											
Size Class (grams)	**Adjusted LD50**	**EECs and RQs**									
		Short Grass		**Tall Grass**		**Broadleaf Plants/ Small Insects**		**Fruits/Pods/ Seeds/ Large Insects**		**Granivore**	
		EEC	**RQ[1]**	**EEC**	**RQ**	**EEC**	**RQ**	**EEC**	**RQ**	**EEC**	**RQ**
15	1461.56	87.10	0.06	39.92	0.03	49.00	0.03	5.44	<0.01	1.21	<0.01
35	1182.56	60.20	0.05	27.59	0.02	33.86	0.03	3.76	<0.01	0.84	<0.01
1000	511.49	13.96	0.03	6.40	0.01	7.85	0.02	0.87	<0.01	0.19	<0.01

[1]LOC for acute risk = 0.5, acute restricted use = 0.2, acute endangered species = 0.1

Table G-10. Fruiting Vegetables and Other Crops 40WSP/Nova 40W 0.125 lbs/A; 4 applications/season; 14-Day Interval Upper Bound Kenaga EECs											
Acute Mammalian Dose-Based Risk Quotients											
Size Class (grams)	**Adjusted LD50**	**EECs and RQs**									
		Short Grass		**Tall Grass**		**Broadleaf Plants/ Small Insects**		**Fruits/Pods/ Seeds/ Large Insects**		**Granivore**	
		EEC	**RQ[1]**	**EEC**	**RQ**	**EEC**	**RQ**	**EEC**	**RQ**	**EEC**	**RQ**
15	1461.56	79.16	0.05	36.28	0.02	44.53	0.03	4.95	0.00	1.10	0.00
35	1182.56	54.71	0.05	25.07	0.02	30.77	0.03	3.42	0.00	0.76	0.00
1000	511.49	12.68	0.02	5.81	0.01	7.13	0.01	0.79	0.00	0.18	0.00

[1]LOC for acute risk = 0.5, acute restricted use = 0.2, acute endangered species = 0.1

Table G-11. Artichokes Rally 40WSP 0.1 lbs/A; 6 applications/season Upper Bound Kenaga EECs											
Acute Mammalian Dose-Based Risk Quotients											
Size Class (grams)	**Adjusted LD50**	**EECs and RQs**									
		Short Grass		**Tall Grass**		**Broadleaf Plants/ Small Insects**		**Fruits/Pods/ Seeds/ Large Insects**		**Granivore**	
		EEC	**RQ[1]**	**EEC**	**RQ**	**EEC**	**RQ**	**EEC**	**RQ**	**EEC**	**RQ**
15	1461.56	76.59	0.05	35.11	0.02	43.08	0.03	4.79	<0.01	1.06	<0.01
35	1182.56	52.94	0.04	24.26	0.02	29.78	0.03	3.31	<0.01	0.74	<0.01
1000	511.49	12.27	0.02	5.63	0.01	6.90	0.01	0.77	<0.01	0.17	<0.01

[1]LOC for acute risk = 0.5, acute restricted use = 0.2, acute endangered species = 0.1

(2) Risk Following Chronic Exposure

Birds

Table G-12. T-REX Tropical Fruits Rally 40WSP/Nova 40W 0.25 lbs/A; 8 applications/season Upper Bound Kenaga								
Chronic Avian Dietary Based Risk Quotients								
	EECs and RQs[1]							
	Short Grass		**Tall Grass**		**Broadleaf Plants/ Small Insects**		**Fruits/Pods/ Seeds/ Large Insects**	
NOAEC (ppm)	**EEC**	**RQ**	**EEC**	**RQ**	**EEC**	**RQ**	**EEC**	**RQ**
256	220.82	0.86	101.21	0.40	124.21	0.49	13.80	0.05

Size class not used for dietary risk quotients
[1]LOC for chronic risk = 1

Table G-13. Fruiting Vegetables and Other Crops 40WSP/Nova 40W 0.125 lbs/A; 4 applications/season; 10-Day Interval Upper Bound Kenaga EECs								
Chronic Avian Dietary Based Risk Quotients								
	EECs and RQs[1]							
	Short Grass		**Tall Grass**		**Broadleaf Plants/ Small Insects**		**Fruits/Pods/ Seeds/ Large Insects**	
NOAEC (ppm)	**EEC**	**RQ**	**EEC**	**RQ**	**EEC**	**RQ**	**EEC**	**RQ**
256	91.36	0.36	41.87	0.16	51.39	0.20	5.71	0.02

Size class not used for dietary risk quotients
[1]LOC for chronic risk = 1

Table G-14. Fruiting Vegetables and Other Crops 40WSP/Nova 40W 0.125 lbs/A; 4 applications/season; 14-Day Interval Upper Bound Kenaga EECs
Chronic Avian Dietary Based Risk Quotients

NOAEC (ppm)	EECs and RQs[1]							
	Short Grass		Tall Grass		Broadleaf Plants/ Small Insects		Fruits/Pods/ Seeds/ Large Insects	
	EEC	RQ	EEC	RQ	EEC	RQ	EEC	RQ
256	83.02	0.32	38.05	0.15	46.70	0.18	5.19	0.02

Size class not used for dietary risk quotients
[1]LOC for chronic risk = 1

Table G-15. Artichokes Rally 40WSP
0.1 lbs/A; 6 applications/season
Upper Bound Kenaga EECs

Chronic Avian Dietary Based Risk Quotients

NOAEC (ppm)	EECs and RQs[1]							
	Short Grass		Tall Grass		Broadleaf Plants/ Small Insects		Fruits/Pods/ Seeds/ Large Insects	
	EEC	RQ	EEC	RQ	EEC	RQ	EEC	RQ
256	80.34	0.31	36.82	0.14	45.19	0.18	5.02	0.02

Size class not used for dietary risk quotients
[1]LOC for chronic risk = 1

Mammals

Table G-16. T-REX Tropical Fruits Rally 40WSP/Nova 40W
0.25 lbs/A; 8 applications/season
Upper Bound Kenaga

Chronic Mammalian Dietary Based Risk Quotients

NOAEC (ppm)[1]	EECs and RQs[1]							
	Short Grass		Tall Grass		Broadleaf Plants/ Small Insects		Fruits/Pods/ Seeds/ Large Insects	
	EEC	RQ	EEC	RQ	EEC	RQ	EEC	RQ
200	220.82	**1.10[2]**	101.21	0.51	124.21	0.62	13.80	0.07

Size class not used for dietary risk quotients

Chronic Mammalian Dose-Based Risk Quotients

Size Class	Adjusted	EECs and RQs

Table G-16. T-REX Tropical Fruits Rally 40WSP/Nova 40W 0.25 lbs/A; 8 applications/season Upper Bound Kenaga

(grams)	NOAEL	Short Grass		Tall Grass		Broadleaf Plants/ Small Insects		Fruits/Pods/ Seeds/ Large Insects		Granivore	
		EEC	RQ	EEC	RQ	EEC	RQ	EEC	RQ	EEC	RQ
15	35.17	210.54	**5.99**	96.50	**2.74**	118.43	**3.37**	13.16	0.37	2.92	0.08
35	28.45	145.51	**5.11**	66.69	**2.34**	81.85	**2.88**	9.09	0.32	2.02	0.07
1000	12.31	33.74	**2.74**	15.46	**1.26**	18.98	**1.54**	2.11	0.17	0.47	0.04

[1]LOC for chronic risk = 1
[2] **Bolded** values exceed LOC

Table G-17. Fruiting Vegetables and Other Crops 40WSP/Nova 40W 0.125 lbs/A; 4 applications/season; 10-Day Application Interval Upper Bound Kenaga EECs

Chronic Mammalian Dietary Based Risk Quotients

NOAEC[1] (ppm)	EECs and RQs[1]							
	Short Grass		Tall Grass		Broadleaf Plants/ Small Insects		Fruits/Pods/ Seeds/ Large Insects	
	EEC	RQ	EEC	RQ	EEC	RQ	EEC	RQ
200	91.36	0.46	41.87	0.21	51.39	0.26	5.71	0.03

Size class not used for dietary risk quotients

Chronic Mammalian Dose-Based Risk Quotients

Size Class (grams)	Adjusted NOAEL	EECs and RQs									
		Short Grass		Tall Grass		Broadleaf Plants/ Small Insects		Fruits/Pods/ Seeds/ Large Insects		Granivore	
		EEC	RQ	EEC	RQ	EEC	RQ	EEC	RQ	EEC	RQ
15	35.17	87.10	**2.48**[1,2]	39.92	**1.14**	49.00	**1.39**	5.44	0.15	1.21	0.03
35	28.45	60.20	**2.12**	27.59	0.97	33.86	**1.19**	3.76	0.13	0.84	0.03
1000	12.31	13.96	**1.13**	6.40	0.52	7.85	0.64	0.87	0.07	0.19	0.02

[1]LOC for chronic risk = 1
[2] **Bolded** values exceed LOC

Table G-18. Fruiting Vegetables and Other Crops 40WSP/Nova 40W 0.125 lbs/A; 4 applications/season; 14-Day Application Interval Upper Bound Kenaga EECs

Chronic Mammalian Dietary Based Risk Quotients

NOAEC[1] (ppm)	EECs and RQs[1]			
	Short Grass	Tall Grass	Broadleaf Plants/ Small Insects	Fruits/Pods/ Seeds/ Large Insects

Table G-18. Fruiting Vegetables and Other Crops 40WSP/Nova 40W 0.125 lbs/A; 4 applications/season; 14-Day Application Interval Upper Bound Kenaga EECs

	EEC	RQ	EEC	RQ	EEC	RQ	EEC	RQ
200	83.02	0.42	38.05	0.19	46.70	0.23	5.19	0.03

Size class not used for dietary risk quotients

Chronic Mammalian Dose-Based Risk Quotients

Size Class (grams)	Adjusted NOAEL	EECs and RQs									
		Short Grass		Tall Grass		Broadleaf Plants/ Small Insects		Fruits/Pods/ Seeds/ Large Insects		Granivore	
		EEC	RQ	EEC	RQ	EEC	RQ	EEC	RQ	EEC	RQ
15	35.17	79.16	**2.25**[1,2]	36.28	**1.03**	44.53	**1.27**	4.95	0.14	1.10	0.03
35	28.45	54.71	**1.92**	25.07	0.88	30.77	**1.08**	3.42	0.12	0.76	0.03
1000	12.31	12.68	**1.03**	5.81	0.47	7.13	0.58	0.79	0.06	0.18	0.01

[1]LOC for chronic risk = 1

[2] **Bolded** values exceed LOC

Table G-19. Artichokes Rally 40WSP 0.1 lbs/A; 6 applications/season Upper Bound Kenaga EECs

Chronic Mammalian Dietary Based Risk Quotients

NOAEC[1] (ppm)	EECs and RQs[1]							
	Short Grass		Tall Grass		Broadleaf Plants/ Small Insects		Fruits/Pods/ Seeds/ Large Insects	
	EEC	RQ	EEC	RQ	EEC	RQ	EEC	RQ
200	80.34	0.40	36.82	0.18	45.19	0.23	5.02	0.03

Size class not used for dietary risk quotients

Chronic Mammalian Dose-Based Risk Quotients

Size Class (grams)	Adjusted NOAEL	EECs and RQs									
		Short Grass		Tall Grass		Broadleaf Plants/ Small Insects		Fruits/Pods/ Seeds/ Large Insects		Granivore	
		EEC	RQ	EEC	RQ	EEC	RQ	EEC	RQ	EEC	RQ
15	35.17	76.59	**2.18**[1,2]	35.11	**1.00**	43.08	**1.23**	4.79	0.14	1.06	0.03
35	28.45	52.94	**1.86**	24.26	0.85	29.78	**1.05**	3.31	0.12	0.74	0.03
1000	12.31	12.27	**1.00**	5.63	0.46	6.90	0.56	0.77	0.06	0.17	0.01

[1]LOC for chronic risk = 1

[2] **Bolded** values exceed LOC

Mean Kenaga values

Acute

Birds

Table G-20. T-REX Tropical Fruits Rally 40WSP/Nova 40W 0.25 lbs/A; 8 applications/season Mean Kenaga EECs									
Acute Avian Dose-Based Risk Quotients									
Size Class (grams)	Adjusted LD50	EECs and RQs							
		Short Grass		Tall Grass		Broadleaf Plants/ Small Insects		Fruits/Pods/ Seeds/ Large Insects	
		EEC	RQ[1,2]	EEC	RQ	EEC	RQ	EEC	RQ
20	358.77	89.16	**0.249**	37.76	**0.11**	47.20	**0.132**	7.34	0.020
100	456.74	50.84	**0.111**	21.53	0.05	26.91	0.059	4.19	0.009
1000	645.16	22.68	0.035	9.61	0.06	12.01	0.019	1.87	0.003

[1]LOC for acute risk = 0.5, acute restricted use = 0.2, acute endangered species = 0.1
[2] **Bolded** values exceed LOC

Table G-21. Fruiting Vegetables and Other Crops Rally 40WSP/Nova 40W 0.125 lbs/A; 4 applications/season; 10-Day Application Interval Mean Kenaga EECs									
Acute Avian Dose-Based Risk Quotients									
Size Class (grams)	Adjusted LD50	EECs and RQs							
		Short Grass		Tall Grass		Broadleaf Plants/ Small Insects		Fruits/Pods/ Seeds/ Large Insects	
		EEC	RQ[1,2]	EEC	RQ	EEC	RQ	EEC	RQ
20	358.77	36.89	**0.103**	15.62	0.044	19.53	0.054	3.04	0.008
100	456.74	21.03	0.046	8.91	0.020	11.13	0.024	1.73	0.004
1000	645.16	9.38	0.015	3.97	0.006	4.97	0.008	0.77	0.001

[1]LOC for acute risk = 0.5, acute restricted use = 0.2, acute endangered species = 0.1
[2] **Bolded** values exceed LOC

Table G-22. Fruiting Vegetables and Other Crops Rally 40WSP/Nova 40W 0.125 lbs/A; 4 applications/season; 14-Day Application Interval Mean Kenaga EECs		
Acute Avian Dose-Based Risk Quotients		
Size Class	Adjusted	EECs and RQs

Table G-22. Fruiting Vegetables and Other Crops Rally 40WSP/Nova 40W 0.125 lbs/A; 4 applications/season; 14-Day Application Interval Mean Kenaga EECs									
Acute Avian Dose-Based Risk Quotients									
(grams)	**LD50**	**Short Grass**		**Tall Grass**		**Broadleaf Plants/ Small Insects**		**Fruits/Pods/ Seeds/ Large Insects**	
		EEC	**RQ[1]**	**EEC**	**RQ**	**EEC**	**RQ**	**EEC**	**RQ**
20	358.77	33.52	0.093	14.20	0.040	17.75	0.049	2.76	0.008
100	456.74	19.11	0.042	8.09	0.018	10.12	0.022	1.57	0.003
1000	645.16	8.53	0.013	3.61	0.006	4.51	0.007	0.70	0.001

[1]LOC for acute risk = 0.5, acute restricted use = 0.2, acute endangered species = 0.1

Table G-23. Artichokes Rally 40WSP 0.1 lbs/A; 6 applications/season Mean Kenaga EECs									
Acute Avian Dose-Based Risk Quotients									
Size Class (grams)	**Adjusted LD50**	**EECs and RQs**							
		Short Grass		**Tall Grass**		**Broadleaf Plants/ Small Insects**		**Fruits/Pods/ Seeds/ Large Insects**	
		EEC	**RQ[1]**	**EEC**	**RQ**	**EEC**	**RQ**	**EEC**	**RQ**
20	358.77	32.44	0.090	13.74	0.038	17.17	0.048	2.67	0.007
100	456.74	18.49	0.040	7.83	0.017	9.79	0.021	1.52	0.003
1000	645.16	8.25	0.013	3.49	0.005	4.37	0.007	0.68	0.001

[1]LOC for acute risk = 0.5, acute restricted use = 0.2, acute endangered species = 0.1

Mammals

Table G-24. T-REX Tropical Fruits Rally 40WSP/Nova 40W 0.25 lbs/A; 8 applications/season Mean Kenaga EECs											
Acute Mammalian Dose-Based Risk Quotients											
Size Class (grams)	**Adjusted LD50[2]**	**EECs and RQs**									
		Short Grass		**Tall Grass**		**Broadleaf Plants/ Small Insects**		**Fruits/Pods/ Seeds/ Large Insects**		**Granivore**	
		EEC	**RQ[1,2]**	**EEC**	**RQ**	**EEC**	**RQ**	**EEC**	**RQ**	**EEC**	**RQ**
15	1461.56	74.30	0.051	31.47	0.022	39.33	0.027	6.12	0.004	1.35	<0.01
35	1182.56	51.62	0.044	21.86	0.018	27.33	0.023	4.25	0.004	0.97	<0.01
1000	511.49	11.73	0.023	4.97	0.010	6.21	0.012	0.97	0.002	0.19	<0.01

[1]LOC for acute risk = 0.5, acute restricted use = 0.2, acute endangered species = 0.1
[2] LD_{50} based on acute toxicity study on the mouse, most sensitive species

Chronic

Mammals

Table G-25. T-REX Tropical Fruits Rally 40WSP/Nova 40W 0.25 lbs/A; 8 applications/season Mean Kenaga EECs								
Chronic Mammalian Dietary Based Risk Quotients								
NOAEC (ppm)[1]	**EECs and RQs[1]**							
	Short Grass		**Tall Grass**		**Broadleaf Plants/ Small Insects**		**Fruits/Pods/ Seeds/ Large Insects**	
	EEC	**RQ**	**EEC**	**RQ**	**EEC**	**RQ**	**EEC**	**RQ**
200	78.21	0.391	33.12	0.166	41.40	0.207	6.44	0.032

Size class not used for dietary risk quotients

Chronic Mammalian Dose-Based Risk Quotients										
Size Class (grams)	**Adjusted NOAEL**	**EECs and RQs**								
		Short Grass		**Tall Grass**		**Broadleaf Plants/ Small Insects**		**Fruits/Pods/ Seeds/ Large Insects**		**Granivore**	
		EEC	**RQ**	**EEC**	**RQ**	**EEC**	**RQ**	**EEC**	**RQ**	**EEC**	**RQ**
15	35.17	74.30	**2.113**[1-3]	31.47	0.895	39.33	**1.119**	6.12	0.174	1.35	0.04
35	28.45	51.62	**1.814**	21.86	0.768	27.33	0.960	4.25	0.149	0.97	0.03
1000	12.31	11.73	0.953	4.97	0.404	6.21	0.505	0.97	0.079	0.19	0.02

[1]LOC for chronic risk = 1

[2] **Bolded** values exceed LOC

Table G-26. Fruiting Vegetables and Other Crops 40WSP/Nova 40W 0.125 lbs/A; 4 applications/season; 10-Day Application Interval Mean Kenaga EECs								
Chronic Mammalian Dietary Based Risk Quotients								
NOAEC[1] (ppm)	**EECs and RQs[1]**							
	Short Grass		**Tall Grass**		**Broadleaf Plants/ Small Insects**		**Fruits/Pods/ Seeds/ Large Insects**	
	EEC	**RQ**	**EEC**	**RQ**	**EEC**	**RQ**	**EEC**	**RQ**
200	32.36	0.162	13.70	0.069	17.13	0.086	2.66	0.013

Size class not used for dietary risk quotients

Chronic Mammalian Dose-Based Risk Quotients						
Size Class (grams)	**Adjusted NOAEL**	**EECs and RQs**				
		Short Grass	**Tall Grass**	**Broadleaf Plants/ Small Insects**	**Fruits/Pods/ Seeds/ Large Insects**	**Granivore**

Table G-26. Fruiting Vegetables and Other Crops 40WSP/Nova 40W
0.125 lbs/A; 4 applications/season; 10-Day Application Interval
Mean Kenaga EECs

		EEC	RQ	EEC	RQ	EEC	RQ	EEC	RQ	EEC	RQ
15	35.17	30.74	0.874	13.02	0.370	16.27	0.463	2.53	0.072	0.56	0.02
35	28.45	21.36	0.751	9.04	0.318	11.31	0.397	1.76	0.062	0.40	0.01
1000	12.31	4.85	0.394	2.06	0.167	2.57	0.209	0.40	0.032	0.08	0.01

[1]LOC for chronic risk = 1

Table G-27. Fruiting Vegetables and Other Crops 40WSP/Nova 40W
0.125 lbs/A; 4 applications/season; 14-Day Application Interval
Mean Kenaga EECs

Chronic Mammalian Dietary Based Risk Quotients

NOAEC[1] (ppm)	EECs and RQs[1]							
	Short Grass		Tall Grass		Broadleaf Plants/ Small Insects		Fruits/Pods/ Seeds/ Large Insects	
	EEC	RQ	EEC	RQ	EEC	RQ	EEC	RQ
200	29.40	0.0147	12.45	0.062	15.57	0.078	2.42	0.012

Size class not used for dietary risk quotients

Chronic Mammalian Dose-Based Risk Quotients

Size Class (grams)	Adjusted NOAEL	EECs and RQs									
		Short Grass		Tall Grass		Broadleaf Plants/ Small Insects		Fruits/Pods/ Seeds/ Large Insects		Granivore	
		EEC	RQ	EEC	RQ	EEC	RQ	EEC	RQ	EEC	RQ
15	35.17	27.93	0.794	11.83	0.336	14.79	0.421	2.30	0.065	0.51	0.01
35	28.45	19.41	0.682	8.22	0.289	10.27	0.361	1.60	0.056	0.36	0.01
1000	12.31	4.41	0.358	1.87	0.152	2.34	0.190	0.36	0.030	0.07	0.01

[1]LOC for chronic risk = 1

Table G-28. Artichokes Rally 40WSP
0.1 lbs/A; 6 applications/season
Mean Kenaga EECs

Chronic Mammalian Dietary Based Risk Quotients

NOAEC[1] (ppm)	EECs and RQs[1]							
	Short Grass		Tall Grass		Broadleaf Plants/ Small Insects		Fruits/Pods/ Seeds/ Large Insects	
	EEC	RQ	EEC	RQ	EEC	RQ	EEC	RQ
200	28.45	0.142	12.05	0.060	15.06	0.075	2.34	0.012

Size class not used for dietary risk quotients

Table G-28. Artichokes Rally 40WSP
0.1 lbs/A; 6 applications/season
Mean Kenaga EECs

Chronic Mammalian Dose-Based Risk Quotients

Size Class (grams)	Adjusted NOAEL	EECs and RQs									
		Short Grass		Tall Grass		Broadleaf Plants/ Small Insects		Fruits/Pods/ Seeds/ Large Insects		Granivore	
		EEC	RQ	EEC	RQ	EEC	RQ	EEC	RQ	EEC	RQ
15	35.17	27.03	0.769	11.45	0.326	14.31	0.407	2.23	0.063	0.49	0.01
35	28.45	18.78	0.660	7.95	0.280	9.94	0.349	1.55	0.054	0.35	0.01
1000	12.31	4.27	0.347	1.81	0.147	2.26	0.184	0.35	0.029	0.07	0.01

[1]LOC for chronic risk = 1

Appendix I. Ecotoxicity and Environmental Fate Bibliography

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Non-Guideline Study

MRID	Citation Reference
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Appendix H
Endangered Species LOCATES

Aggregated Taxa Count by State for All Selected

No species exclusions.

Minimum of 1 Acre
All Medium Types Reported

eggplant, okra, peppers, bell, peppers, chile (all peppers - excluding bell), pimientos, avocados, avocados (PR), bananas, bananas (PR), citron (PR), citrus fruit, all, citrus fruit, other, fruits / other (PR), fruits and coconuts (PR), grapefruit, grapefruit (PR), guavas, k-early citrus, kiwifruit, kumquats, lemons, lemons and limes (PR), limes, mangoes, mangoes (PR), nectarines, oranges (PR), oranges, all, oranges, other, oranges, valencia, papayas, papayas (PR), passion fruit, pineapples (PR), pineapples harvested, pineapples not harvested, plantains (PR), pomegranates, soursops (PR), tangelos, tangerines, temples, amaranth, celery, escarole and endive, lettuce, all, lettuce, head, lettuce, leaf, lettuce, romaine, parsley, rhubarb, artichokes

AL, AK, AZ, AR, CA, CO, CT, DE, DC, FL, GA, HI, ID, IL, IN, IA, KS, KY, LA, ME, MD, MA, MI, MN, MS, MO, MT, NE, NV, NH, NJ, NM, NY, NC, ND, OH, OK, OR, PA, PR, RI, SC, SD, TN, TX, UT, VT, VA, WA, WV, WI, WY

	Amphibian	Bird	Fish	Reptile
AL	2	3	15	5
AR	0	2	2	0
AZ	2	7	18	2
CA	6	15	30	8
CO	0	2	6	0
CT	0	2	1	1
DE	0	1	1	1
FL	1	9	4	10
GA	1	4	7	2
HI	0	32	0	2
IA	0	2	2	0
ID	0	0	7	0
IL	0	2	1	0
IN	0	1	0	1
KS	0	3	4	0
KY	0	6	4	0
LA	0	4	2	7

	Amphibian	Bird	Fish	Reptile
MA	0	3	1	2
MD	0	1	2	1
ME	0	2	2	0
MI	0	2	0	1
MN	0	1	0	0
MO	0	2	5	0
MS	1	5	3	7
MT	0	3	4	0
NC	0	4	4	5
ND	0	3	1	0
NE	0	3	2	0
NJ	0	2	1	1
NM	1	6	13	1
NV	0	2	15	1
NY	0	2	1	1
OH	0	1	1	2
OK	0	5	4	0
OR	0	4	19	0
PA	0	1	0	1
PR	3	9	0	7
RI	0	1	1	0
SC	1	4	1	5
SD	0	3	2	0
TN	0	3	14	0
TX	4	12	7	6
UT	0	2	8	1
VA	1	2	7	1
WA	0	4	19	0
WI	0	3	0	0
WV	1	0	0	0

	Amphibian	Bird	Fish	Reptile
Counties:	108	818	569	326
States:	12	45	39	26
Species:	20	77	128	33

258 species:

'Akepa, Hawaii	*Loxops coccineus coccineus*	Bird	Terrestrial
'Akepa, Maui	*Loxops coccineus ochraceus*	Bird	Terrestrial
'Akia Loa, Kauai (Hemignathus procerus)	*Hemignathus procerus*	Bird	Terrestrial
'Akia Pola'au (Hemignathus munroi)	*Hemignathus munroi*	Bird	Terrestrial
Albatross, Short-tailed	*Phoebastria (=Diomedea) albatrus*	Bird	Terrestrial, Saltwater
Blackbird, Yellow-shouldered	*Agelaius xanthomus*	Bird	Terrestrial
Boa, Mona	*Epicrates monensis monensis*	Reptile	Terrestrial
Boa, Puerto Rican	*Epicrates inornatus*	Reptile	Terrestrial
Bobwhite, Masked	*Colinus virginianus ridgwayi*	Bird	Terrestrial
Caracara, Audubon's Crested	*Polyborus plancus audubonii*	Bird	Terrestrial
Catfish, Yaqui	*Ictalurus pricei*	Fish	Freshwater
Cavefish, Alabama	*Speoplatyrhinus poulsoni*	Fish	Freshwater
Cavefish, Ozark	*Amblyopsis rosae*	Fish	Freshwater
Chub, Bonytail	*Gila elegans*	Fish	Freshwater
Chub, Chihuahua	*Gila nigrescens*	Fish	Freshwater
Chub, Gila	*Gila intermedia*	Fish	Freshwater
Chub, Humpback	*Gila cypha*	Fish	Freshwater
Chub, Hutton Tui	*Gila bicolor ssp.*	Fish	Freshwater
Chub, Mohave Tui	*Gila bicolor mohavensis*	Fish	Freshwater
Chub, Oregon	*Oregonichthys crameri*	Fish	Freshwater
Chub, Owens Tui	*Gila bicolor snyderi*	Fish	Freshwater
Chub, Slender	*Erimystax cahni*	Fish	Freshwater
Chub, Sonora	*Gila ditaenia*	Fish	Freshwater
Chub, Spotfin	*Erimonax monachus*	Fish	Freshwater
Chub, Virgin River	*Gila seminuda (=robusta)*	Fish	Freshwater

Chub, Yaqui	*Gila purpurea*	Fish	Freshwater
Condor, California	*Gymnogyps californianus*	Bird	Terrestrial
Coot, Hawaiian (=Alae keo keo)	*Fulica americana alai*	Bird	Terrestrial
Coqui, Golden	*Eleutherodactylus jasperi*	Amphibian	Freshwater, Terrestrial
Crane, Mississippi Sandhill	*Grus canadensis pulla*	Bird	Terrestrial, Freshwater
Crane, Whooping	*Grus americana*	Bird	Terrestrial, Freshwater
Creeper, Hawaii	*Oreomystis mana*	Bird	Terrestrial
Creeper, Molokai (Kakawahie)	*Paroreomyza flammea*	Bird	Terrestrial
Creeper, Oahu (Alauwahio)	*Paroreomyza maculata*	Bird	Terrestrial
Crocodile, American	*Crocodylus acutus*	Reptile	Terrestrial, Freshwater
Crow, Hawaiian ('Alala)	*Corvus hawaiiensis*	Bird	Terrestrial
Cui-ui	*Chasmistes cujus*	Fish	Freshwater
Curlew, Eskimo	*Numenius borealis*	Bird	Terrestrial
Dace, Ash Meadows Speckled	*Rhinichthys osculus nevadensis*	Fish	Freshwater
Dace, Blackside	*Phoxinus cumberlandensis*	Fish	Freshwater
Dace, Moapa	*Moapa coriacea*	Fish	Freshwater
Darter, Amber	*Percina antesella*	Fish	Freshwater
Darter, Bayou	*Etheostoma rubrum*	Fish	Freshwater
Darter, Bluemask (=jewel)	*Etheostoma /*	Fish	Freshwater
Darter, Boulder	*Etheostoma wapiti*	Fish	Freshwater
Darter, Cherokee	*Etheostoma scotti*	Fish	Freshwater
Darter, Duskytail	*Etheostoma percnurum*	Fish	Freshwater
Darter, Etowah	*Etheostoma etowahae*	Fish	Freshwater
Darter, Fountain	*Etheostoma fonticola*	Fish	Freshwater
Darter, Goldline	*Percina aurolineata*	Fish	Freshwater
Darter, Leopard	*Percina pantherina*	Fish	Freshwater
Darter, Maryland	*Etheostoma sellare*	Fish	Freshwater
Darter, Niangua	*Etheostoma nianguae*	Fish	Freshwater
Darter, Okaloosa	*Etheostoma okaloosae*	Fish	Freshwater
Darter, Relict	*Etheostoma chienense*	Fish	Freshwater

Darter, Slackwater	*Etheostoma boschungi*	Fish	Freshwater
Darter, Snail	*Percina tanasi*	Fish	Freshwater
Darter, Vermilion	*Etheostoma chermocki*	Fish	Freshwater
Darter, Watercress	*Etheostoma nuchale*	Fish	Freshwater
Duck, Hawaiian (Koloa)	*Anas wyvilliana*	Bird	Freshwater, Terrestrial
Duck, Laysan	*Anas laysanensis*	Bird	Terrestrial, Freshwater
Elepaio, Oahu	*Chasiempis sandwichensis ibidis*	Bird	Terrestrial
Falcon, Northern Aplomado	*Falco femoralis septentrionalis*	Bird	Terrestrial
Finch, Laysan	*Telespyza cantans*	Bird	Terrestrial
Finch, Nihoa	*Telespyza ultima*	Bird	Terrestrial
Flycatcher, Southwestern Willow	*Empidonax traillii extimus*	Bird	Terrestrial
Frog, California Red-legged	*Rana aurora draytonii*	Amphibian	Terrestrial, Freshwater
Frog, Chiricahua Leopard	*Rana chiricahuensis*	Amphibian	Freshwater, Terrestrial
Frog, Dusky Gopher (Mississippi DPS)	*Rana capito sevosa*	Amphibian	Terrestrial, Freshwater
Frog, Mountain Yellow-legged	*Gopherus agassizii*	Amphibian	Terrestrial, Freshwater
Gambusia, Big Bend	*Gambusia gaigei*	Fish	Freshwater
Gambusia, Pecos	*Gambusia nobilis*	Fish	Freshwater
Gambusia, San Marcos	*Gambusia georgei*	Fish	Freshwater
Gecko, Monito	*Sphaerodactylus micropithecus*	Reptile	Terrestrial
Gnatcatcher, Coastal California	*Polioptila californica californica*	Bird	Terrestrial
Goby, Tidewater	*Eucyclogobius newberryi*	Fish	Freshwater
Goose, Hawaiian (Nene)	*Branta (=Nesochen) sandvicensis*	Bird	Terrestrial, Freshwater
Guajon	*Eleutherodactylus cooki*	Amphibian	Freshwater, Terrestrial
Hawk, Hawaiian (Io)	*Buteo solitarius*	Bird	Terrestrial
Hawk, Puerto Rican Broad-winged	*Buteo platypterus brunnescens*	Bird	Terrestrial
Hawk, Puerto Rican Sharp-shinned	*Accipiter striatus venator*	Bird	Terrestrial
Honeycreeper, Crested ('Akohekohe)	*Palmeria dolei*	Bird	Terrestrial
Iguana, Mona Ground	*Cyclura stejnegeri*	Reptile	Terrestrial
Kite, Everglade Snail	*Rostrhamus sociabilis plumbeus*	Bird	Terrestrial
Lizard, Blunt-nosed Leopard	*Gambelia silus*	Reptile	Terrestrial

Lizard, Coachella Valley Fringe-toed	*Uma inornata*	Reptile	Terrestrial
Lizard, Island Night	*Xantusia riversiana*	Reptile	Terrestrial
Logperch, Conasauga	*Percina jenkinsi*	Fish	Freshwater
Logperch, Roanoke	*Percina rex*	Fish	Freshwater
Madtom, Neosho	*Noturus placidus*	Fish	Freshwater
Madtom, Pygmy	*Noturus stanauli*	Fish	Freshwater
Madtom, Scioto	*Noturus trautmani*	Fish	Freshwater
Madtom, Smoky	*Noturus baileyi*	Fish	Freshwater
Madtom, Yellowfin	*Noturus flavipinnis*	Fish	Freshwater
Millerbird, Nihoa	*Acrocephalus familiaris kingi*	Bird	Terrestrial
Minnow, Loach	*Tiaroga cobitis*	Fish	Freshwater
Minnow, Rio Grande Silvery	*Hybognathus amarus*	Fish	Freshwater
Moorhen, Hawaiian Common	*Gallinula chloropus sandvicensis*	Bird	Terrestrial
Murrelet, Marbled	*Brachyramphus marmoratus marmoratus*	Bird	Freshwater, Terrestrial, Saltwater
Nightjar, Puerto Rico	*Caprimulgus noctitherus*	Bird	Terrestrial
Nuku Pu'u	*Hemignathus lucidus*	Bird	Terrestrial
'O'o, Kauai (='A'a)	*Moho braccatus*	Bird	Terrestrial
'O'u (Honeycreeper)	*Psittirostra psittacea*	Bird	Terrestrial
Owl, Mexican Spotted	*Strix occidentalis lucida*	Bird	Terrestrial
Owl, Northern Spotted	*Strix occidentalis caurina*	Bird	Terrestrial
Palila	*Loxioides bailleui*	Bird	Terrestrial
Parrot, Puerto Rican	*Amazona vittata*	Bird	Terrestrial
Parrotbill, Maui	*Pseudonestor xanthophrys*	Bird	Terrestrial
Pelican, Brown	*Pelecanus occidentalis*	Bird	Terrestrial
Petrel, Hawaiian Dark-rumped	*Pterodroma phaeopygia sandwichensis*	Bird	Terrestrial
Pigeon, Puerto Rican Plain	*Columba inornata wetmorei*	Bird	Terrestrial
Plover, Piping	*Charadrius melodus*	Bird	Terrestrial
Plover, Western Snowy	*Charadrius alexandrinus nivosus*	Bird	Terrestrial
Poolfish, Pahrump (= Pahrump Killifish)	*Empetrichthys latos*	Fish	Freshwater
Po'ouli	*Melamprosops phaeosoma*	Bird	Terrestrial

Prairie-chicken, Attwater's Greater	*Tympanuchus cupido attwateri*	Bird	Terrestrial
Pupfish, Ash Meadows Amargosa	*Cyprinodon nevadensis mionectes*	Fish	Freshwater
Pupfish, Comanche Springs	*Cyprinodon elegans*	Fish	Freshwater
Pupfish, Desert	*Cyprinodon macularius*	Fish	Freshwater
Pupfish, Devils Hole	*Cyprinodon diabolis*	Fish	Freshwater
Pupfish, Leon Springs	*Cyprinodon bovinus*	Fish	Freshwater
Pupfish, Owens	*Cyprinodon radiosus*	Fish	Freshwater
Pupfish, Warm Springs	*Cyprinodon nevadensis pectoralis*	Fish	Freshwater
Pygmy-owl, Cactus Ferruginous	*Glaucidium brasilianum cactorum*	Bird	Terrestrial
Rail, California Clapper	*Rallus longirostris obsoletus*	Bird	Terrestrial
Rail, Light-footed Clapper	*Rallus longirostris levipes*	Bird	Terrestrial
Rail, Yuma Clapper	*Rallus longirostris yumanensis*	Bird	Terrestrial
Rattlesnake, New Mexican Ridge-nosed	*Crotalus willardi obscurus*	Reptile	Terrestrial
Salamander, Barton Springs	*Eurycea sosorum*	Amphibian	Freshwater, Terrestrial
Salamander, California Tiger	*Ambystoma californiense*	Amphibian	Terrestrial, Vernal pool
Salamander, Cheat Mountain	*Plethodon nettingi*	Amphibian	Freshwater, Terrestrial
Salamander, Desert Slender	*Batrachoseps aridus*	Amphibian	Freshwater, Terrestrial
Salamander, Flatwoods	*Ambystoma cingulatum*	Amphibian	Freshwater, Vernal pool, Terrestrial
Salamander, Red Hills	*Phaeognathus hubrichti*	Amphibian	Freshwater, Terrestrial
Salamander, San Marcos	*Eurycea nana*	Amphibian	Freshwater, Terrestrial
Salamander, Santa Cruz Long-toed	*Ambystoma macrodactylum croceum*	Amphibian	Freshwater, Vernal pool, Terrestrial
Salamander, Shenandoah	*Plethodon shenandoah*	Amphibian	Freshwater, Terrestrial
Salamander, Sonora Tiger	*Ambystoma tigrinum stebbinsi*	Amphibian	Vernal pool, Freshwater, Terrestrial
Salamander, Texas Blind	*Typhlomolge rathbuni*	Amphibian	Subterraneous, Freshwater
Salmon, Atlantic	*Salmo salar*	Fish	Brackish, Saltwater, Freshwater
Salmon, Chinook (California Coastal Run)	*Oncorhynchus (=Salmo) tshawytscha*	Fish	Freshwater, Saltwater, Brackish
Salmon, Chinook (Central Valley Fall Run)	*Oncorhynchus (=Salmo) tshawytscha*	Fish	Brackish, Freshwater, Saltwater
Salmon, Chinook (Central Valley Spring Run)	*Oncorhynchus (=Salmo) tshawytscha*	Fish	Brackish, Saltwater, Freshwater
Salmon, Chinook (Lower Columbia River)	*Oncorhynchus (=Salmo) tshawytscha*	Fish	Freshwater, Brackish, Saltwater
Salmon, Chinook (Puget Sound)	*Oncorhynchus (=Salmo) tshawytscha*	Fish	Freshwater, Brackish, Saltwater

Salmon, Chinook (Sacramento River Winter Run)	*Oncorhynchus (=Salmo) tshawytscha*	Fish	Saltwater, Freshwater, Brackish
Salmon, Chinook (Snake River Fall Run)	*Oncorhynchus (=Salmo) tshawytscha*	Fish	Freshwater, Saltwater, Brackish
Salmon, Chinook (Snake River spring/summer)	*Oncorhynchus (=Salmo) tshawytscha*	Fish	Brackish, Saltwater, Freshwater
Salmon, Chinook (Upper Columbia River Spring)	*Oncorhynchus (=Salmo) tshawytscha*	Fish	Freshwater, Saltwater, Brackish
Salmon, Chinook (Upper Willamette River)	*Oncorhynchus (=Salmo) tshawytscha*	Fish	Saltwater, Brackish, Freshwater
Salmon, Chum (Columbia River population)	*Oncorhynchus (=Salmo) keta*	Fish	Brackish, Freshwater, Saltwater
Salmon, Chum (Hood Canal Summer population)	*Oncorhynchus (=Salmo) keta*	Fish	Freshwater, Brackish, Saltwater
Salmon, Coho (Central California Coast population)	*Oncorhynchus (=Salmo) kisutch*	Fish	Saltwater, Brackish, Freshwater
Salmon, Coho (Southern OR/Northern CA Coast)	*Oncorhynchus (=Salmo) kisutch*	Fish	Freshwater, Brackish, Saltwater
Salmon, Sockeye (Ozette Lake population)	*Oncorhynchus (=Salmo) nerka*	Fish	Saltwater, Freshwater, Brackish
Salmon, Sockeye (Snake River population)	*Oncorhynchus (=Salmo) nerka*	Fish	Brackish, Saltwater, Freshwater
Sawfish, Smalltooth	*Pristis pectinata*	Fish	Saltwater, Freshwater
Scrub-Jay, Florida	*Aphelocoma coerulescens*	Bird	Terrestrial
Sculpin, Pygmy	*Cottus paulus (=pygmaeus)*	Fish	Freshwater
Sea turtle, green	*Chelonia mydas*	Reptile	Saltwater
Sea turtle, hawksbill	*Eretmochelys imbricata*	Reptile	Saltwater
Sea turtle, Kemp's ridley	*Lepidochelys kempii*	Reptile	Saltwater
Sea turtle, leatherback	*Dermochelys coriacea*	Reptile	Saltwater
Sea turtle, loggerhead	*Caretta caretta*	Reptile	Saltwater
Sea turtle, olive ridley	*Lepidochelys olivacea*	Reptile	Saltwater
Shearwater, Newell's Townsend's	*Puffinus auricularis newelli*	Bird	Terrestrial, Saltwater
Shiner, Arkansas River	*Notropis girardi*	Fish	Freshwater
Shiner, Beautiful	*Cyprinella formosa*	Fish	Freshwater
Shiner, Blue	*Cyprinella caerulea*	Fish	Freshwater
Shiner, Cahaba	*Notropis cahabae*	Fish	Freshwater
Shiner, Cape Fear	*Notropis mekistocholas*	Fish	Freshwater
Shiner, Palezone	*Notropis albizonatus*	Fish	Freshwater

Shiner, Pecos Bluntnose	*Notropis simus pecosensis*	Fish	Freshwater
Shiner, Topeka	*Notropis topeka (=tristis)*	Fish	Freshwater
Shrike, San Clemente Loggerhead	*Lanius ludovicianus mearnsi*	Bird	Terrestrial
Silverside, Waccamaw	*Menidia extensa*	Fish	Freshwater
Skink, Blue-tailed Mole	*Eumeces egregius lividus*	Reptile	Terrestrial
Skink, Sand	*Neoseps reynoldsi*	Reptile	Terrestrial
Smelt, Delta	*Hypomesus transpacificus*	Fish	Freshwater, Brackish
Snake, Atlantic Salt Marsh	*Nerodia clarkii taeniata*	Reptile	Saltwater, Terrestrial, Brackish
Snake, Concho Water	*Nerodia paucimaculata*	Reptile	Freshwater, Terrestrial
Snake, Eastern Indigo	*Drymarchon corais couperi*	Reptile	Terrestrial
Snake, Giant Garter	*Thamnophis gigas*	Reptile	Freshwater, Terrestrial
Snake, Lake Erie Water	*Nerodia sipedon insularum*	Reptile	Terrestrial, Freshwater
Snake, Northern Copperbelly Water	*Nerodia erythrogaster neglecta*	Reptile	Freshwater, Terrestrial
Snake, San Francisco Garter	*Thamnophis sirtalis tetrataenia*	Reptile	Freshwater, Terrestrial
Sparrow, Cape Sable Seaside	*Ammodramus maritimus mirabilis*	Bird	Terrestrial
Sparrow, Florida Grasshopper	*Ammodramus savannarum floridanus*	Bird	Terrestrial
Sparrow, San Clemente Sage	*Amphispiza belli clementeae*	Bird	Terrestrial
Spikedace	*Meda fulgida*	Fish	Freshwater
Spinedace, Little Colorado	*Lepidomeda vittata*	Fish	Freshwater
Spinedace, White River	*Lepidomeda albivallis*	Fish	Freshwater
Springfish, Railroad Valley	*Crenichthys nevadae*	Fish	Freshwater
Squawfish, Colorado	*Ptychocheilus lucius*	Fish	Freshwater
Starling, Ponape Mountain	*Aplonis pelzelni*	Bird	Terrestrial
Steelhead, (California Central Valley population)	*Oncorhynchus (=Salmo) mykiss*	Fish	Brackish, Freshwater, Saltwater
Steelhead, (Central California Coast population)	*Oncorhynchus (=Salmo) mykiss*	Fish	Freshwater, Saltwater, Brackish
Steelhead, (Lower Columbia River population)	*Oncorhynchus (=Salmo) mykiss*	Fish	Brackish, Freshwater, Saltwater
Steelhead, (Middle Columbia River population)	*Oncorhynchus (=Salmo) mykiss*	Fish	Freshwater, Saltwater, Brackish
Steelhead, (Northern California population)	*Oncorhynchus (=Salmo) mykiss*	Fish	Saltwater, Brackish, Freshwater
Steelhead, (Snake River Basin population)	*Oncorhynchus (=Salmo) mykiss*	Fish	Freshwater, Brackish, Saltwater

Steelhead, (South-Central California population)	*Oncorhynchus (=Salmo) mykiss*	Fish	Freshwater, Saltwater, Brackish
Steelhead, (Southern California population)	*Oncorhynchus (=Salmo) mykiss*	Fish	Brackish, Saltwater, Freshwater
Steelhead, (Upper Columbia River population)	*Oncorhynchus (=Salmo) mykiss*	Fish	Brackish, Saltwater, Freshwater
Steelhead, (Upper Willamette River population)	*Oncorhynchus (=Salmo) mykiss*	Fish	Brackish, Saltwater, Freshwater
Steelhead, Puget Sound	*Oncorhynchus mykiss*	Fish	
Stickleback, Unarmored Threespine	*Gasterosteus aculeatus williamsoni*	Fish	Freshwater
Stilt, Hawaiian (=Ae'o)	*Himantopus mexicanus knudseni*	Bird	Terrestrial
Stork, Wood	*Mycteria americana*	Bird	Terrestrial
Sturgeon, Alabama	*Scaphirhynchus suttkusi*	Fish	Freshwater
Sturgeon, green	*Acipenser medirostris*	Fish	
Sturgeon, Gulf	*Acipenser oxyrinchus desotoi*	Fish	Saltwater, Freshwater
Sturgeon, Pallid	*Scaphirhynchus albus*	Fish	Freshwater
Sturgeon, Shortnose	*Acipenser brevirostrum*	Fish	Saltwater, Freshwater
Sucker, June	*Chasmistes liorus*	Fish	Freshwater
Sucker, Lost River	*Deltistes luxatus*	Fish	Freshwater
Sucker, Modoc	*Catostomus microps*	Fish	Freshwater
Sucker, Razorback	*Xyrauchen texanus*	Fish	Freshwater
Sucker, Santa Ana	*Catostomus santaanae*	Fish	Freshwater
Sucker, Shortnose	*Chasmistes brevirostris*	Fish	Freshwater
Sucker, Warner	*Catostomus warnerensis*	Fish	Freshwater
Tern, California Least	*Sterna antillarum browni*	Bird	Terrestrial
Tern, Interior (population) Least	*Sterna antillarum*	Bird	Terrestrial
Tern, Roseate	*Sterna dougallii dougallii*	Bird	Terrestrial
Thrush, Large Kauai	*Myadestes myadestinus*	Bird	Terrestrial
Thrush, Molokai (Oloma'o)	*Myadestes lanaiensis rutha*	Bird	Terrestrial
Thrush, Small Kauai (Puaiohi)	*Myadestes palmeri*	Bird	Terrestrial
Toad, Arroyo Southwestern	*Bufo californicus (=microscaphus)*	Amphibian	Freshwater, Terrestrial
Toad, Houston	*Bufo houstonensis*	Amphibian	Terrestrial, Freshwater
Toad, Puerto Rican Crested	*Peltophryne lemur*	Amphibian	Terrestrial, Freshwater

Topminnow, Gila (Yaqui)	*Poeciliopsis occidentalis*	Fish	Freshwater
Tortoise, Desert	*Gopherus agassizii*	Reptile	Terrestrial
Tortoise, Gopher	*Gopherus polyphemus*	Reptile	Terrestrial
Towhee, Inyo Brown	*Pipilo crissalis eremophilus*	Bird	Terrestrial
Trout, Apache	*Oncorhynchus apache*	Fish	Freshwater
Trout, Bull	*Salvelinus confluentus*	Fish	Freshwater
Trout, Bull (Columbia River population)	*Salvelinus confluentus*	Fish	Freshwater
Trout, Bull (Klamath River population)	*Salvelinus confluentus*	Fish	Freshwater
Trout, Gila	*Oncorhynchus gilae*	Fish	Freshwater
Trout, Greenback Cutthroat	*Oncorhynchus clarki stomias*	Fish	Freshwater
Trout, Lahontan Cutthroat	*Oncorhynchus clarki henshawi*	Fish	Freshwater
Trout, Little Kern Golden	*Oncorhynchus aguabonita whitei*	Fish	Freshwater
Trout, Paiute Cutthroat	*Oncorhynchus clarki seleniris*	Fish	Freshwater
Turtle, Alabama Red-bellied	*Pseudemys alabamensis*	Reptile	Terrestrial, Freshwater
Turtle, Bog (Northern population)	*Clemmys muhlenbergii*	Reptile	Terrestrial, Freshwater
Turtle, Flattened Musk	*Sternotherus depressus*	Reptile	Freshwater, Terrestrial
Turtle, Plymouth Red-bellied	*Pseudemys rubriventris bangsi*	Reptile	Terrestrial, Freshwater
Turtle, Ringed Sawback	*Graptemys oculifera*	Reptile	Freshwater, Terrestrial
Turtle, Yellow-blotched Map	*Graptemys flavimaculata*	Reptile	Freshwater, Terrestrial
Vireo, Black-capped	*Vireo atricapilla*	Bird	Terrestrial
Vireo, Least Bell's	*Vireo bellii pusillus*	Bird	Terrestrial
Warbler (=Wood), Golden-cheeked	*Dendroica chrysoparia*	Bird	Terrestrial
Warbler (=Wood), Kirtland's	*Dendroica kirtlandii*	Bird	Terrestrial
Warbler, Bachman's	*Vermivora bachmanii*	Bird	Terrestrial
Whipsnake (=Striped Racer), Alameda	*Masticophis lateralis euryxanthus*	Reptile	Terrestrial
Woodpecker, Ivory-billed	*Campephilus principalis*	Bird	Terrestrial
Woodpecker, Red-cockaded	*Picoides borealis*	Bird	Terrestrial
Woundfin	*Plagopterus argentissimus*	Fish	Freshwater

	Bivalve	Crustacea	Gastropod
AL	30	1	10
AR	5	1	1
AZ	0	0	1
CA	0	9	1
CT	1	0	0
FL	7	1	1
GA	16	0	0
HI	0	1	39
IA	2	0	1
ID	0	0	5
IL	7	1	1
IN	10	0	0
KY	22	1	0
LA	3	0	0
MD	1	0	0
MI	2	0	0
MN	2	0	0

	Bivalve	Crustacea	Gastropod
MO	5	0	0
MS	8	0	0
NC	8	0	0
NH	1	0	0
NM	0	2	5
NY	1	0	1
OH	6	0	0
OK	2	0	0
OR	0	1	0
PA	2	0	0
SC	1	0	0
TN	36	1	1
TX	0	1	1
VA	21	2	1
VT	1	0	0
WI	2	0	0
WV	5	0	1

	Bivalve	Crustacea	Gastropod
Counties:	366	60	36
States:	27	12	15
Species:	68	21	67

156 species:

Abalone, White	*Haliotis sorenseni*	Crustacean	Saltwater
Ambersnail, Kanab	*Oxyloma haydeni kanabensis*	Gastropod	Freshwater, Terrestrial
Amphipod, Illinois Cave	*Gammarus acherondytes*	Crustacean	Subterraneous, Freshwater
Amphipod, Kauai Cave	*Spelaeorchestia koloana*	Crustacean	Freshwater, Subterraneous
Amphipod, Noel's	*Gammarus desperatus*	Crustacean	Freshwater
Amphipod, Peck's Cave	*Stygobromus (=Stygonectes) pecki*	Crustacean	Subterraneous, Freshwater
Bankclimber, Purple	*Elliptoideus sloatianus*	Bivalve	Freshwater
Campeloma, Slender	*Campeloma decampi*	Gastropod	Freshwater
Combshell, Southern (=Penitent mussel)	*Epioblasma penita*	Bivalve	Freshwater
Combshell, Upland	*Epioblasma metastriata*	Bivalve	Freshwater
Crayfish, Cave (Cambarus aculabrum)	*Cambarus aculabrum*	Crustacean	Freshwater
Crayfish, Nashville	*Orconectes shoupi*	Crustacean	Freshwater
Crayfish, Shasta	*Pacifastacus fortis*	Crustacean	Freshwater
Elimia, Lacy	*Elimia crenatella*	Gastropod	Freshwater
Elktoe, Appalachian	*Alasmidonta raveneliana*	Bivalve	Freshwater
Fairy Shrimp, Conservancy Fairy	*Branchinecta conservatio*	Crustacean	Vernal pool
Fairy Shrimp, Longhorn	*Branchinecta longiantenna*	Crustacean	Vernal pool
Fairy Shrimp, Riverside	*Streptocephalus woottoni*	Crustacean	Vernal pool
Fairy Shrimp, San Diego	*Branchinecta sandiegonensis*	Crustacean	Vernal pool
Fairy Shrimp, Vernal Pool	*Branchinecta lynchi*	Crustacean	Vernal pool
Fanshell	*Cyprogenia stegaria*	Bivalve	Freshwater
Fatmucket, Arkansas	*Lampsilis powelli*	Bivalve	Freshwater
Isopod, Lee County Cave	*Lirceus usdagalun*	Crustacean	Freshwater
Isopod, Madison Cave	*Antrolana lira*	Crustacean	Freshwater
Isopod, Socorro	*Thermosphaeroma thermophilus*	Crustacean	Freshwater

Kidneyshell, Triangular	*Ptychobranchus greenii*	Bivalve	Freshwater
Limpet, Banbury Springs	*Lanx sp.*	Gastropod	Freshwater
Mucket, Orangenacre	*Lampsilis perovalis*	Bivalve	Freshwater
Mucket, Pink (Pearlymussel)	*Lampsilis abrupta*	Bivalve	Freshwater
Mussel, Acornshell Southern	*Epioblasma othcaloogensis*	Bivalve	Freshwater
Mussel, Alabama Moccasinshell	*Medionidus acutissimus*	Bivalve	Freshwater
Mussel, Black (=Curtus' Mussel) Clubshell	*Pleurobema curtum*	Bivalve	Freshwater
Mussel, Clubshell	*Pleurobema clava*	Bivalve	Freshwater
Mussel, Coosa Moccasinshell	*Medionidus parvulus*	Bivalve	Freshwater
Mussel, Cumberland Combshell	*Epioblasma brevidens*	Bivalve	Freshwater
Mussel, Cumberland Elktoe	*Alasmidonta atropurpurea*	Bivalve	Freshwater
Mussel, Cumberland Pigtoe	*Pleurobema gibberum*	Bivalve	Freshwater
Mussel, Dark Pigtoe	*Pleurobema furvum*	Bivalve	Freshwater
Mussel, Dwarf Wedge	*Alasmidonta heterodon*	Bivalve	Freshwater
Mussel, Fine-lined Pocketbook	*Lampsilis altilis*	Bivalve	Freshwater
Mussel, Fine-rayed Pigtoe	*Fusconaia cuneolus*	Bivalve	Freshwater
Mussel, Flat Pigtoe (=Marshall's Mussel)	*Pleurobema marshalli*	Bivalve	Freshwater
Mussel, Gulf Moccasinshell	*Medionidus penicillatus*	Bivalve	Freshwater
Mussel, Heavy Pigtoe (=Judge Tait's Mussel)	*Pleurobema taitianum*	Bivalve	Freshwater
Mussel, Heelsplitter Carolina	*Lasmigona decorata*	Bivalve	Freshwater
Mussel, Heelsplitter Inflated	*Potamilus inflatus*	Bivalve	Freshwater
Mussel, Ochlockonee Moccasinshell	*Medionidus simpsonianus*	Bivalve	Freshwater
Mussel, Oval Pigtoe	*Pleurobema pyriforme*	Bivalve	Freshwater
Mussel, Ovate Clubshell	*Pleurobema perovatum*	Bivalve	Freshwater
Mussel, Oyster	*Epioblasma capsaeformis*	Bivalve	Freshwater
Mussel, Ring Pink (=Golf Stick Pearly)	*Obovaria retusa*	Bivalve	Freshwater
Mussel, Rough Pigtoe	*Pleurobema plenum*	Bivalve	Freshwater
Mussel, Scaleshell	*Leptodea leptodon*	Bivalve	Freshwater
Mussel, Shiny Pigtoe	*Fusconaia cor*	Bivalve	Freshwater
Mussel, Shiny-rayed Pocketbook	*Lampsilis subangulata*	Bivalve	Freshwater

Mussel, Southern Clubshell	*Pleurobema decisum*	Bivalve	Freshwater
Mussel, Southern Pigtoe	*Pleurobema georgianum*	Bivalve	Freshwater
Mussel, Winged Mapleleaf	*Quadrula fragosa*	Bivalve	Freshwater
Pearlshell, Louisiana	*Margaritifera hembeli*	Bivalve	Freshwater
Pearlymussel, Alabama Lamp	*Lampsilis virescens*	Bivalve	Freshwater
Pearlymussel, Appalachian Monkeyface	*Quadrula sparsa*	Bivalve	Freshwater
Pearlymussel, Birdwing	*Conradilla caelata*	Bivalve	Freshwater
Pearlymussel, Cracking	*Hemistena lata*	Bivalve	Freshwater
Pearlymussel, Cumberland Bean	*Villosa trabalis*	Bivalve	Freshwater
Pearlymussel, Cumberland Monkeyface	*Quadrula intermedia*	Bivalve	Freshwater
Pearlymussel, Dromedary	*Dromus dromas*	Bivalve	Freshwater
Pearlymussel, Fat Pocketbook	*Potamilus capax*	Bivalve	Freshwater
Pearlymussel, Green-blossom	*Epioblasma torulosa gubernaculum*	Bivalve	Freshwater
Pearlymussel, Higgins' Eye	*Lampsilis higginsii*	Bivalve	Freshwater
Pearlymussel, Little-wing	*Pegias fabula*	Bivalve	Freshwater
Pearlymussel, Orange-footed	*Plethobasus cooperianus*	Bivalve	Freshwater
Pearlymussel, Pale Lilliput	*Toxolasma cylindrellus*	Bivalve	Freshwater
Pearlymussel, Purple Cat's Paw	*Epioblasma obliquata obliquata*	Bivalve	Freshwater
Pearlymussel, Tubercled-blossom	*Epioblasma torulosa torulosa*	Bivalve	Freshwater
Pearlymussel, Turgid-blossom	*Epioblasma turgidula*	Bivalve	Freshwater
Pearlymussel, White Cat's Paw	*Epioblasma obliquata perobliqua*	Bivalve	Freshwater
Pearlymussel, White Wartyback	*Plethobasus cicatricosus*	Bivalve	Freshwater
Pearlymussel, Yellow-blossom	*Epioblasma florentina florentina*	Bivalve	Freshwater
Pebblesnail, Flat	*Lepyrium showalteri*	Gastropod	Freshwater
Purple Bean	*Villosa perpurpurea*	Bivalve	Freshwater
Rabbitsfoot, Rough	*Quadrula cylindrica strigillata*	Bivalve	Freshwater
Riffleshell, Northern	*Epioblasma torulosa rangiana*	Bivalve	Freshwater
Riffleshell, Tan	*Epioblasma florentina walkeri (=E. walkeri)*	Bivalve	Freshwater
Riversnail, Anthony's	*Athearnia anthonyi*	Gastropod	Freshwater
Rock-pocketbook, Ouachita (=Wheeler's pm)	*Arkansia wheeleri*	Bivalve	Freshwater

Rocksnail, Painted	*Leptoxis taeniata*	Gastropod	Freshwater
Rocksnail, Plicate	*Leptoxis plicata*	Gastropod	Freshwater
Rocksnail, Round	*Leptoxis ampla*	Gastropod	Freshwater
Shagreen, Magazine Mountain	*Mesodon magazinensis*	Gastropod	Terrestrial
Shrimp, Alabama Cave	*Palaemonias alabamae*	Crustacean	Freshwater
Shrimp, California Freshwater	*Syncaris pacifica*	Crustacean	Freshwater
Shrimp, Kentucky Cave	*Palaemonias ganteri*	Crustacean	Freshwater
Shrimp, Squirrel Chimney Cave	*Palaemonetes cummingi*	Crustacean	Freshwater, Subterraneous
Slabshell, Chipola	*Elliptio chipolaensis*	Bivalve	Freshwater
Snail, Armored	*Pyrgulopsis (=Marstonia) pachyta*	Gastropod	Freshwater
Snail, Bliss Rapids	*Taylorconcha serpenticola*	Gastropod	Freshwater
Snail, Chittenango Ovate Amber	*Succinea chittenangoensis*	Gastropod	Terrestrial, Freshwater
Snail, Flat-spired Three-toothed	*Triodopsis platysayoides*	Gastropod	Terrestrial
Snail, Iowa Pleistocene	*Discus macclintocki*	Gastropod	Terrestrial
Snail, Lioplax Cylindrical	*Lioplax cyclostomaformis*	Gastropod	Freshwater
Snail, Morro Shoulderband	*Helminthoglypta walkeriana*	Gastropod	Terrestrial
Snail, Newcomb's	*Erinna newcombi*	Gastropod	Freshwater
Snail, O'ahu Tree (Achatinella abbreviata)	*Achatinella abbreviata*	Gastropod	Terrestrial
Snail, O'ahu Tree (Achatinella apexfulva)	*Achatinella apexfulva*	Gastropod	Terrestrial
Snail, O'ahu Tree (Achatinella bellula)	*Achatinella bellula*	Gastropod	Terrestrial
Snail, O'ahu Tree (Achatinella buddii)	*Achatinella buddii*	Gastropod	Terrestrial
Snail, O'ahu Tree (Achatinella bulimoides)	*Achatinella bulimoides*	Gastropod	Terrestrial
Snail, O'ahu Tree (Achatinella byronii)	*Achatinella byronii*	Gastropod	Terrestrial
Snail, O'ahu Tree (Achatinella caesia)	*Achatinella caesia*	Gastropod	Terrestrial
Snail, O'ahu Tree (Achatinella casta)	*Achatinella casta*	Gastropod	Terrestrial
Snail, O'ahu Tree (Achatinella cestus)	*Achatinella cestus*	Gastropod	Terrestrial
Snail, O'ahu Tree (Achatinella concavospira)	*Achatinella concavospira*	Gastropod	Terrestrial
Snail, O'ahu Tree (Achatinella curta)	*Achatinella curta*	Gastropod	Terrestrial
Snail, O'ahu Tree (Achatinella decipiens)	*Achatinella decipiens*	Gastropod	Terrestrial
Snail, O'ahu Tree (Achatinella decora)	*Achatinella decora*	Gastropod	Terrestrial

Snail, O'ahu Tree (Achatinella dimorpha)	*Achatinella dimorpha*	Gastropod	Terrestrial
Snail, O'ahu Tree (Achatinella elegans)	*Achatinella elegans*	Gastropod	Terrestrial
Snail, O'ahu Tree (Achatinella fulgens)	*Achatinella fulgens*	Gastropod	Terrestrial
Snail, O'ahu Tree (Achatinella fuscobasis)	*Achatinella fuscobasis*	Gastropod	Terrestrial
Snail, O'ahu Tree (Achatinella juddii)	*Achatinella juddii*	Gastropod	Terrestrial
Snail, O'ahu Tree (Achatinella juncea)	*Achatinella juncea*	Gastropod	Terrestrial
Snail, O'ahu Tree (Achatinella lehuiensis)	*Achatinella lehuiensis*	Gastropod	Terrestrial
Snail, O'ahu Tree (Achatinella leucorraphe)	*Achatinella leucorraphe*	Gastropod	Terrestrial
Snail, O'ahu Tree (Achatinella lila)	*Achatinella lila*	Gastropod	Terrestrial
Snail, O'ahu Tree (Achatinella livida)	*Achatinella livida*	Gastropod	Terrestrial
Snail, O'ahu Tree (Achatinella lorata)	*Achatinella lorata*	Gastropod	Terrestrial
Snail, O'ahu Tree (Achatinella mustelina)	*Achatinella mustelina*	Gastropod	Terrestrial
Snail, O'ahu Tree (Achatinella papyracea)	*Achatinella papyracea*	Gastropod	Terrestrial
Snail, O'ahu Tree (Achatinella phaeozona)	*Achatinella phaeozona*	Gastropod	Terrestrial
Snail, O'ahu Tree (Achatinella pulcherrima)	*Achatinella pulcherrima*	Gastropod	Terrestrial
Snail, O'ahu Tree (Achatinella pupukanioe)	*Achatinella pupukanioe*	Gastropod	Terrestrial
Snail, O'ahu Tree (Achatinella rosea)	*Achatinella rosea*	Gastropod	Terrestrial
Snail, O'ahu Tree (Achatinella sowerbyana)	*Achatinella sowerbyana*	Gastropod	Terrestrial
Snail, O'ahu Tree (Achatinella spaldingi)	*Achatinella spaldingi*	Gastropod	Terrestrial
Snail, O'ahu Tree (Achatinella stewartii)	*Achatinella stewartii*	Gastropod	Terrestrial
Snail, O'ahu Tree (Achatinella swiftii)	*Achatinella swiftii*	Gastropod	Terrestrial
Snail, O'ahu Tree (Achatinella taeniolata)	*Achatinella taeniolata*	Gastropod	Terrestrial
Snail, O'ahu Tree (Achatinella thaanumi)	*Achatinella thaanumi*	Gastropod	Terrestrial
Snail, O'ahu Tree (Achatinella turgida)	*Achatinella turgida*	Gastropod	Terrestrial
Snail, O'ahu Tree (Achatinella valida)	*Achatinella valida*	Gastropod	Terrestrial
Snail, Pecos Assiminea	*Assiminea pecos*	Gastropod	Freshwater
Snail, Snake River Physa	*Physa natricina*	Gastropod	Terrestrial
Snail, Stock Island Tree	*Orthalicus reses (not incl. nesodryas)*	Gastropod	Terrestrial
Snail, Tulotoma	*Tulotoma magnifica*	Gastropod	Terrestrial
Snail, Utah Valvata	*Valvata utahensis*	Gastropod	Terrestrial

Bivalve Crustacea Gastropod

Snail, Virginia Fringed Mountain	*Polygyriscus virginianus*	Gastropod	Terrestrial
Spinymussel, James River	*Pleurobema collina*	Bivalve	Freshwater
Spinymussel, Tar River	*Elliptio steinstansana*	Bivalve	Freshwater
Springsnail, Alamosa	*Tryonia alamosae*	Gastropod	Freshwater
Springsnail, Idaho	*Fontelicella idahoensis*	Gastropod	Freshwater
Springsnail, Koster's	*Juturnia kosteri*	Gastropod	Terrestrial
Springsnail, Roswell	*Pyrgulopsis roswellensis*	Gastropod	Freshwater
Springsnail, Socorro	*Pyrgulopsis neomexicana*	Gastropod	Freshwater
Stirrupshell	*Quadrula stapes*	Bivalve	Freshwater
Tadpole Shrimp, Vernal Pool	*Lepidurus packardi*	Crustacean	Vernal pool
Threeridge, Fat (Mussel)	*Amblema neislerii*	Bivalve	Freshwater

	Mammal	Marine
AK	0	1
AL	4	0
AR	2	0
AZ	9	0
CA	20	2
CO	2	0
CT	1	0
DE	1	0
FL	13	1
GA	3	1
HI	1	1
IA	1	0
ID	4	0
IL	2	0
IN	2	0
KS	2	0
KY	3	0

	Mammal	Marine
LA	1	1
MA	1	0
MD	2	0
ME	1	0
MI	3	0
MN	2	0
MO	2	0
MS	2	0
MT	3	0
NC	4	1
NE	1	0
NH	1	0
NJ	1	0
NM	5	0
NY	1	0
OH	2	0
OK	3	0
OR	1	0
PA	2	0
PR	0	1
RI	1	0
SC	1	3
SD	1	0
TN	3	0
TX	5	0
UT	2	0
VA	5	0
VT	1	0
WA	4	0
WI	2	0

	Mammal	Marine
WV	4	0
WY	1	0

	Mammal	Marine
Counties:	1073	103
States:	47	9
Species:	60	7

68 species:

Bat, Gray	*Myotis grisescens*	Mammal	Subterraneous, Terrestrial
Bat, Hawaiian Hoary	*Lasiurus cinereus semotus*	Mammal	Terrestrial, Subterraneous
Bat, Indiana	*Myotis sodalis*	Mammal	Subterraneous, Terrestrial
Bat, Lesser (=Sanborn's) Long-nosed	*Leptonycteris curasoae yerbabuenae*	Mammal	Subterraneous, Terrestrial
Bat, Mexican Long-nosed	*Leptonycteris nivalis*	Mammal	Subterraneous, Terrestrial
Bat, Ozark Big-eared	*Corynorhinus (=Plecotus) townsendii ingens*	Mammal	Terrestrial, Subterraneous
Bat, Virginia Big-eared	*Corynorhinus (=Plecotus) townsendii virginianus*	Mammal	Terrestrial, Subterraneous
Bear, Grizzly	*Ursus arctos horribilis*	Mammal	Terrestrial
Bear, Louisiana Black	*Ursus americanus luteolus*	Mammal	Terrestrial
Caribou, Woodland	*Rangifer tarandus caribou*	Mammal	Terrestrial
Deer, Columbian White-tailed	*Odocoileus virginianus leucurus*	Mammal	Terrestrial
Deer, Key	*Odocoileus virginianus clavium*	Mammal	Terrestrial
Ferret, Black-footed	*Mustela nigripes*	Mammal	Terrestrial
Fox, San Joaquin Kit	*Vulpes macrotis mutica*	Mammal	Terrestrial
Fox, San Miguel Island	*Urocyon littoralis littoralis*	Mammal	Terrestrial
Fox, Santa Catalina Island	*Urocyon littoralis catalinae*	Mammal	Terrestrial
Fox, Santa Cruz Island	*Urocyon littoralis santacruzae*	Mammal	Terrestrial
Fox, Santa Rosa Island	*Urocyon littoralis santarosae*	Mammal	Terrestrial
Jaguar	*Panthera onca*	Mammal	Terrestrial
Jaguarundi, Gulf Coast	*Herpailurus (=Felis) yagouaroundi cacomitli*	Mammal	Terrestrial
Jaguarundi, Sinaloan	*Herpailurus (=Felis) yagouaroundi tolteca*	Mammal	Terrestrial
Kangaroo Rat, Fresno	*Dipodomys nitratoides exilis*	Mammal	Terrestrial
Kangaroo Rat, Giant	*Dipodomys ingens*	Mammal	Terrestrial
Kangaroo Rat, Morro Bay	*Dipodomys heermanni morroensis*	Mammal	Terrestrial
Kangaroo Rat, San Bernardino Merriam's	*Dipodomys merriami parvus*	Mammal	Terrestrial

Kangaroo Rat, Stephens'	*Dipodomys stephensi (incl. D. cascus)*	Mammal	Terrestrial
Kangaroo Rat, Tipton	*Dipodomys nitratoides nitratoides*	Mammal	Terrestrial
Lynx, Canada	*Lynx canadensis*	Mammal	Terrestrial
Manatee, West Indian	*Trichechus manatus*	Marine mml	Saltwater
Mountain Beaver, Point Arena	*Aplodontia rufa nigra*	Mammal	Freshwater, Terrestrial
Mouse, Alabama Beach	*Peromyscus polionotus ammobates*	Mammal	Terrestrial, Coastal (neritic)
Mouse, Anastasia Island Beach	*Peromyscus polionotus phasma*	Mammal	Terrestrial, Coastal (neritic)
Mouse, Choctawhatchee Beach	*Peromyscus polionotus allophrys*	Mammal	Coastal (neritic), Terrestrial
Mouse, Key Largo Cotton	*Peromyscus gossypinus allapaticola*	Mammal	Terrestrial
Mouse, Pacific Pocket	*Perognathus longimembris pacificus*	Mammal	Terrestrial
Mouse, Perdido Key Beach	*Peromyscus polionotus trissyllepsis*	Mammal	Coastal (neritic)
Mouse, Preble's Meadow Jumping	*Zapus hudsonius preblei*	Mammal	Terrestrial
Mouse, Salt Marsh Harvest	*Reithrodontomys raviventris*	Mammal	Terrestrial
Mouse, Southeastern Beach	*Peromyscus polionotus niveiventris*	Mammal	Coastal (neritic), Terrestrial
Ocelot	*Leopardus (=Felis) pardalis*	Mammal	Terrestrial
Otter, Northern Sea	*Enhydra lutris kenyoni*	Marine mml	Saltwater
Otter, Southern Sea	*Enhydra lutris nereis*	Marine mml	Saltwater
Panther, Florida	*Puma (=Felis) concolor coryi*	Mammal	Terrestrial
Prairie Dog, Utah	*Cynomys parvidens*	Mammal	Terrestrial, Subterraneous
Pronghorn, Sonoran	*Antilocapra americana sonoriensis*	Mammal	Terrestrial
Rabbit, Lower Keys Marsh	*Sylvilagus palustris hefneri*	Mammal	Terrestrial
Rabbit, Pygmy	*Brachylagus idahoensis*	Mammal	Terrestrial
Rabbit, Riparian Brush	*Sylvilagus bachmani riparius*	Mammal	Terrestrial
Rice Rat (=Silver Rice Rat)	*Oryzomys palustris natator*	Mammal	Terrestrial
Seal, Guadalupe Fur	*Arctocephalus townsendi*	Marine mml	Coastal (neritic), Saltwater
Seal, Hawaiian Monk	*Monachus schauinslandi*	Marine mml	Coastal (neritic), Saltwater
Sheep, Peninsular Bighorn	*Ovis canadensis*	Mammal	Terrestrial
Sheep, Sierra Nevada Bighorn	*Ovis canadensis californiana*	Mammal	Terrestrial
Shrew, Buena Vista Lake Ornate	*Sorex ornatus relictus*	Mammal	Terrestrial
Squirrel, Carolina Northern Flying	*Glaucomys sabrinus coloratus*	Mammal	Terrestrial

Mammal	Marine		
Squirrel, Delmarva Peninsula Fox	*Sciurus niger cinereus*	Mammal	Terrestrial
Squirrel, Mount Graham Red	*Tamiasciurus hudsonicus grahamensis*	Mammal	Terrestrial
Squirrel, Northern Idaho Ground	*Spermophilus brunneus brunneus*	Mammal	Terrestrial
Squirrel, Virginia Northern Flying	*Glaucomys sabrinus fuscus*	Mammal	Terrestrial
Vole, Amargosa	*Microtus californicus scirpensis*	Mammal	Terrestrial
Vole, Florida Salt Marsh	*Microtus pennsylvanicus dukecampbelli*	Mammal	Terrestrial, Brackish
Vole, Hualapai Mexican	*Microtus mexicanus hualpaiensis*	Mammal	Terrestrial
Whale, Finback	*Balaenoptera physalus*	Marine mml	Saltwater
Whale, Humpback	*Megaptera novaeangliae*	Marine mml	Saltwater
Wolf, Gray	*Canis lupus*	Mammal	Terrestrial
Wolf, Gray	*Canis lupus*	Mammal	Terrestrial
Woodrat, Key Largo	*Neotoma floridana smalli*	Mammal	Terrestrial
Woodrat, Riparian	*Neotoma fuscipes riparia*	Mammal	Terrestrial

	Conf/cycd	Dicot	Ferns	Monocot
AK	0	0	1	0
AL	0	10	2	3
AR	0	3	0	0
AZ	0	15	0	2
CA	2	159	0	17
CO	0	8	0	1
CT	0	1	0	1
DE	0	0	0	2
FL	1	47	0	2
GA	1	9	2	5
HI	0	233	12	22
IA	0	3	1	2
ID	0	3	0	0
IL	0	7	0	2
IN	0	4	0	0
KS	0	1	0	1
KY	0	9	0	0

	Conf/cycd	Dicot	Ferns	Monocot
LA	0	2	1	0
MA	0	1	0	2
MD	0	4	0	2
ME	0	1	0	2
MI	0	4	1	3
MN	0	2	0	2
MO	0	6	0	1
MS	0	2	1	0
MT	0	2	0	0
NC	0	21	0	5
NE	0	0	0	1
NH	0	1	0	1
NJ	0	2	0	3
NM	0	13	0	0
NV	0	8	0	0
NY	0	4	1	1
OH	0	4	0	2
OK	0	0	0	2
OR	0	11	0	2
PA	0	0	0	2
PR	0	35	8	5
RI	0	1	0	1
SC	0	12	1	6
SD	0	0	0	1
TN	0	15	1	1
TX	0	25	0	2
UT	0	13	0	1
VA	0	12	0	4
VT	0	1	0	1
WA	0	7	0	0

	Conf/cycd	Dicot	Ferns	Monocot
WI	0	4	0	2
WV	0	4	0	1

	Conf/cycd	Dicot	Ferns	Monocot
Counties:	6	685	40	362
States:	3	43	12	38
Species:	3	613	25	67

708 species:

Abutilon eremitopetalum (ncn)	*Abutilon eremitopetalum*	Dicot	Terrestrial
Abutilon sandwicense (ncn)	*Abutilon sandwicense*	Dicot	Terrestrial
Achyranthes mutica (ncn)	*Achyranthes mutica*	Dicot	Terrestrial
Achyranthes splendens var. rotundata (ncn)	*Achyranthes splendens var. rotundata*	Dicot	Terrestrial
Adobe Sunburst, San Joaquin	*Pseudobahia peirsonii*	Dicot	Terrestrial
A'e (Zanthoxylum dipetalum var. tomentosum)	*Zanthoxylum dipetalum var. tomentosum*	Dicot	Terrestrial
A'e (Zanthoxylum hawaiiense)	*Zanthoxylum hawaiiense*	Dicot	Terrestrial
'Aiea (Nothocestrum breviflorum)	*Nothocestrum breviflorum*	Dicot	Terrestrial
'Aiea (Nothocestrum peltatum)	*Nothocestrum peltatum*	Dicot	Terrestrial
'Akoko (Chamaesyce celastroides var. kaenana)	*Chamaesyce celastroides var. kaenana*	Dicot	Terrestrial
'Akoko (Chamaesyce deppeana)	*Chamaesyce deppeana*	Dicot	Terrestrial
'Akoko (Chamaesyce herbstii)	*Chamaesyce herbstii*	Dicot	Terrestrial
'Akoko (Chamaesyce kuwaleana)	*Chamaesyce kuwaleana*	Dicot	Terrestrial
'Akoko (Chamaesyce rockii)	*Chamaesyce rockii*	Dicot	Terrestrial
'Akoko (Chamaesyce skottsbergii var. skottsbe	*Chamaesyce skottsbergii var. kalaeloana*	Dicot	Terrestrial
'Akoko (Euphorbia haeleeleana)	*Euphorbia haeleeleana*	Dicot	Terrestrial
Alani (Melicope adscendens)	*Melicope adscendens*	Dicot	Terrestrial
Alani (Melicope balloui)	*Melicope balloui*	Dicot	Terrestrial
Alani (Melicope haupuensis)	*Melicope haupuensis*	Dicot	Terrestrial
Alani (Melicope knudsenii)	*Melicope knudsenii*	Dicot	Terrestrial
Alani (Melicope lydgatei)	*Melicope lydgatei*	Dicot	Terrestrial
Alani (Melicope mucronulata)	*Melicope mucronulata*	Dicot	Terrestrial
Alani (Melicope munroi)	*Melicope munroi*	Dicot	Terrestrial
Alani (Melicope ovalis)	*Melicope ovalis*	Dicot	Terrestrial

Alani (Melicope pallida)	*Melicope pallida*	Dicot	Terrestrial
Alani (Melicope quadrangularis)	*Melicope quadrangularis*	Dicot	Terrestrial
Alani (Melicope reflexa)	*Melicope reflexa*	Dicot	Terrestrial
Alani (Melicope saint-johnii)	*Melicope saint-johnii*	Dicot	Terrestrial
Alani (Melicope zahlbruckneri)	*Melicope zahlbruckneri*	Dicot	Terrestrial
Allocarya, Calistoga	*Plagiobothrys strictus*	Dicot	Vernal pool
Alopecurus, Sonoma	*Alopecurus aequalis var. sonomensis*	Monocot	Terrestrial
Alsinidendron obovatum (ncn)	*Alsinidendron obovatum*	Dicot	Terrestrial
Alsinidendron trinerve (ncn)	*Alsinidendron trinerve*	Dicot	Terrestrial
Alsinidendron viscosum (ncn)	*Alsinidendron viscosum*	Dicot	Terrestrial
Amaranth, Seabeach	*Amaranthus pumilus*	Dicot	Coastal (neritic)
Amaranthus brownii (ncn)	*Amaranthus brownii*	Dicot	Terrestrial
Ambrosia, San Diego	*Ambrosia pumila*	Dicot	Terrestrial
Ambrosia, South Texas	*Ambrosia cheiranthifolia*	Dicot	Terrestrial
Amole, Cammatta Canyon	*Chlorogalum purpureum var. reductum*	Monocot	Terrestrial
Amole, Purple	*Chlorogalum purpureum var. purpureum*	Monocot	Terrestrial
Amphianthus, Little	*Amphianthus pusillus*	Dicot	Freshwater
'Anaunau (Lepidium arbuscula)	*Lepidium arbuscula*	Dicot	Terrestrial
'Anunu (Sicyos alba)	*Sicyos alba*	Dicot	Terrestrial
Aristida chaseae (ncn)	*Aristida chaseae*	Monocot	Terrestrial
Arrowhead, Bunched	*Sagittaria fasciculata*	Monocot	Freshwater
Asplenium fragile var. insulare (ncn)	*Asplenium fragile var. insulare*	Ferns	Terrestrial
Aster, Decurrent False	*Boltonia decurrens*	Dicot	Terrestrial, Freshwater
Aster, Florida Golden	*Chrysopsis floridana*	Dicot	Terrestrial
Auerodendron pauciflorum (ncn)	*Auerodendron pauciflorum*	Dicot	Terrestrial
Aupaka (Isodendrion hosakae)	*Isodendrion hosakae*	Dicot	Terrestrial
Aupaka (Isodendrion laurifolium)	*Isodendrion laurifolium*	Dicot	Terrestrial
Aupaka (Isodendrion longifolium)	*Isodendrion longifolium*	Dicot	Terrestrial
Avens, Spreading	*Geum radiatum*	Dicot	Terrestrial
'Awikiwiki (Canavalia molokaiensis)	*Canavalia molokaiensis*	Dicot	Terrestrial

'Awiwi (Centaurium sebaeoides)	*Centaurium sebaeoides*	Dicot	Terrestrial
'Awiwi (Hedyotis cookiana)	*Hedyotis cookiana*	Dicot	Terrestrial
Ayenia, Texas	*Ayenia limitaris*	Dicot	Terrestrial
Baccharis, Encinitas	*Baccharis vanessae*	Dicot	Terrestrial
Barbara Buttons, Mohr's	*Marshallia mohrii*	Dicot	Terrestrial
Barberry, Island	*Berberis pinnata ssp. insularis*	Dicot	Terrestrial
Barberry, Nevin's	*Berberis nevinii*	Dicot	Terrestrial
Bariaco	*Trichilia triacantha*	Dicot	Terrestrial
Beaked-rush, Knieskern's	*Rhynchospora knieskernii*	Monocot	Terrestrial
Beardtongue, Penland	*Penstemon penlandii*	Dicot	Terrestrial
Beargrass, Britton's	*Nolina brittoniana*	Monocot	Terrestrial
Bear-poppy, Dwarf	*Arctomecon humilis*	Dicot	Terrestrial
Bedstraw, El Dorado	*Galium californicum ssp. sierrae*	Dicot	Terrestrial
Bedstraw, Island	*Galium buxifolium*	Dicot	Terrestrial
Bellflower, Brooksville	*Campanula robinsiae*	Dicot	Terrestrial
Birch, Virginia Round-leaf	*Betula uber*	Dicot	Floodplain
Bird's-beak, Palmate-bracted	*Cordylanthus palmatus*	Dicot	Terrestrial
Bird's-beak, Pennell's	*Cordylanthus tenuis ssp. capillaris*	Dicot	Terrestrial
Bird's-beak, salt marsh	*Cordylanthus maritimus ssp. maritimus*	Dicot	Saltwater
Bird's-beak, Soft	*Cordylanthus mollis ssp. mollis*	Dicot	Brackish, Saltwater
Birds-in-a-nest, White	*Macbridea alba*	Dicot	Terrestrial
Bittercress, Small-anthered	*Cardamine micranthera*	Dicot	Terrestrial
Bladderpod, Lyrate	*Lesquerella lyrata*	Dicot	Terrestrial
Bladderpod, Missouri	*Lesquerella filiformis*	Dicot	Terrestrial
Bladderpod, San Bernardino Mountains	*Lesquerella kingii ssp. bernardina*	Dicot	Terrestrial
Bladderpod, Spring Creek	*Lesquerella perforata*	Dicot	Floodplain
Bladderpod, White	*Lesquerella pallida*	Dicot	Terrestrial
Bladderpod, Zapata	*Lesquerella thamnophila*	Dicot	Terrestrial
Blazing Star, Ash Meadows	*Mentzelia leucophylla*	Dicot	Terrestrial
Blazing Star, Heller's	*Liatris helleri*	Dicot	Terrestrial

Blazing Star, Scrub	*Liatris ohlingerae*	Dicot	Terrestrial
Bluecurls, Hidden Lake	*Trichostema austromontanum ssp. compactum*	Dicot	Terrestrial
Bluegrass, Hawaiian	*Poa sandvicensis*	Monocot	Terrestrial
Bluegrass, Mann's (Poa mannii)	*Poa mannii*	Monocot	Terrestrial
Bluegrass, Napa	*Poa napensis*	Monocot	Terrestrial, Freshwater
Bluegrass, San Bernardino	*Poa atropurpurea*	Monocot	Terrestrial
Blue-star, Kearney's	*Amsonia kearneyana*	Dicot	Terrestrial
Bluet, Roan Mountain	*Hedyotis purpurea var. montana*	Dicot	Terrestrial
Bonamia menziesii (ncn)	*Bonamia menziesii*	Dicot	Terrestrial
Bonamia, Florida	*Bonamia grandiflora*	Dicot	Terrestrial
Boxwood, Vahl's	*Buxus vahlii*	Dicot	Terrestrial
Brodiaea, Chinese Camp	*Brodiaea pallida*	Monocot	Terrestrial
Brodiaea, Thread-leaved	*Brodiaea filifolia*	Monocot	Terrestrial
Broom, San Clemente Island	*Lotus dendroideus ssp. traskiae*	Dicot	Terrestrial
Buckwheat, Cushenbury	*Eriogonum ovalifolium var. vineum*	Dicot	Terrestrial
Buckwheat, Ione (incl. Irish Hill)	*Eriogonum apricum (incl. var. prostratum)*	Dicot	Terrestrial
Buckwheat, Scrub	*Eriogonum longifolium var. gnaphalifolium*	Dicot	Terrestrial
Buckwheat, Southern Mountain Wild	*Eriogonum kennedyi var. austromontanum*	Dicot	Terrestrial
Buckwheat, Steamboat	*Eriogonum ovalifolium var. williamsiae*	Dicot	Terrestrial
Bulrush, Northeastern (=Barbed Bristle)	*Scirpus ancistrochaetus*	Monocot	Terrestrial, Freshwater
Bush-mallow, San Clemente Island	*Malacothamnus clementinus*	Dicot	Terrestrial
Bush-mallow, Santa Cruz Island	*Malacothamnus fasciculatus var. nesioticus*	Dicot	Terrestrial
Buttercup, Autumn	*Ranunculus aestivalis (=acriformis)*	Dicot	Terrestrial
Butterfly Plant, Colorado	*Gaura neomexicana var. coloradensis*	Dicot	Terrestrial
Butterweed, Layne's	*Senecio layneae*	Dicot	Terrestrial
Butterwort, Godfrey's	*Pinguicula ionantha*	Dicot	Terrestrial, Freshwater
Button-celery, San Diego	*Eryngium aristulatum var. parishii*	Dicot	Terrestrial
Cactus, Arizona Hedgehog	*Echinocereus triglochidiatus var. arizonicus*	Dicot	Terrestrial
Cactus, Bakersfield	*Opuntia treleasei*	Dicot	Terrestrial
Cactus, Black Lace	*Echinocereus reichenbachii var. albertii*	Dicot	Terrestrial

Cactus, Brady Pincushion	*Pediocactus bradyi*	Dicot	Terrestrial
Cactus, Bunched Cory	*Coryphantha ramillosa*	Dicot	Terrestrial
Cactus, Chisos Mountain Hedgehog	*Echinocereus chisoensis var. chisoensis*	Dicot	Terrestrial
Cactus, Cochise Pincushion	*Coryphantha robbinsorum*	Dicot	Terrestrial
Cactus, Key Tree	*Pilosocereus robinii*	Dicot	Terrestrial
Cactus, Knowlton	*Pediocactus knowltonii*	Dicot	Terrestrial
Cactus, Kuenzler Hedgehog	*Echinocereus fendleri var. kuenzleri*	Dicot	Terrestrial
Cactus, Lee Pincushion	*Coryphantha sneedii var. leei*	Dicot	Terrestrial
Cactus, Lloyd's Mariposa	*Echinomastus mariposensis*	Dicot	Terrestrial
Cactus, Mesa Verde	*Sclerocactus mesae-verdae*	Dicot	Terrestrial
Cactus, Nellie Cory	*Coryphantha minima*	Dicot	Terrestrial
Cactus, Nichol's Turk's Head	*Echinocactus horizonthalonius var. nicholii*	Dicot	Terrestrial
Cactus, Pima Pineapple	*Coryphantha scheeri var. robustispina*	Dicot	Terrestrial
Cactus, Siler Pincushion	*Pediocactus (=Echinocactus,=Utahia) sileri*	Dicot	Terrestrial
Cactus, Sneed Pincushion	*Coryphantha sneedii var. sneedii*	Dicot	Terrestrial
Cactus, Star	*Astrophytum asterias*	Dicot	Terrestrial
Cactus, Tobusch Fishhook	*Ancistrocactus tobuschii*	Dicot	Terrestrial
Cactus, Uinta Basin Hookless	*Sclerocactus glaucus*	Dicot	Terrestrial
Calyptranthes Thomasiana (ncn)	*Calyptranthes thomasiana*	Dicot	Terrestrial
Campion, Fringed	*Silene polypetala*	Dicot	Terrestrial
Capa Rosa	*Callicarpa ampla*	Dicot	Terrestrial
Catchfly, Spalding's	*Silene spaldingii*	Dicot	Terrestrial
Catesbaea Melanocarpa (ncn)	*Catesbaea melanocarpa*	Dicot	Terrestrial
Cat's-eye, Terlingua Creek	*Cryptantha crassipes*	Dicot	Terrestrial
Ceanothus, Coyote	*Ceanothus ferrisae*	Dicot	Terrestrial
Ceanothus, Pine Hill	*Ceanothus roderickii*	Dicot	Terrestrial
Ceanothus, Vail Lake	*Ceanothus ophiochilus*	Dicot	Terrestrial
Centaury, Spring-loving	*Centaurium namophilum*	Dicot	Terrestrial
Chaffseed, American	*Schwalbea americana*	Dicot	Terrestrial
Chamaecrista glandulosa (ncn)	*Chamaecrista glandulosa var. mirabilis*	Dicot	Terrestrial

Chamaesyce Halemanui (ncn)	*Chamaesyce halemanui*	Dicot	Terrestrial
Checker-mallow, Keck's	*Sidalcea keckii*	Dicot	Terrestrial
Checker-mallow, Kenwood Marsh	*Sidalcea oregana ssp. valida*	Dicot	Terrestrial
Checker-mallow, Nelson's	*Sidalcea nelsoniana*	Dicot	Terrestrial
Checker-mallow, Pedate	*Sidalcea pedata*	Dicot	Terrestrial
Checker-mallow, Wenatchee Mountains	*Sidalcea oregana var. calva*	Dicot	Terrestrial
Chumbo, Higo	*Harrisia portoricensis*	Dicot	Terrestrial
Chupacallos	*Pleodendron macranthum*	Dicot	Terrestrial
Clarkia, Pismo	*Clarkia speciosa ssp. immaculata*	Dicot	Terrestrial
Clarkia, Presidio	*Clarkia franciscana*	Dicot	Terrestrial
Clarkia, Springville	*Clarkia springvillensis*	Dicot	Terrestrial
Clarkia, Vine Hill	*Clarkia imbricata*	Dicot	Terrestrial
Cliffrose, Arizona	*Purshia (=cowania) subintegra*	Dicot	Terrestrial
Clover, Fleshy Owl's	*Castilleja campestris ssp. succulenta*	Dicot	Vernal pool
Clover, Leafy Prairie	*Dalea foliosa*	Dicot	Terrestrial
Clover, Monterey	*Trifolium trichocalyx*	Dicot	Terrestrial
Clover, Prairie Bush	*Lespedeza leptostachya*	Dicot	Terrestrial
Clover, Running Buffalo	*Trifolium stoloniferum*	Dicot	Terrestrial
Clover, Showy Indian	*Trifolium amoenum*	Dicot	Terrestrial
Cobana Negra	*Stahlia monosperma*	Dicot	Terrestrial
Coneflower, Smooth	*Echinacea laevigata*	Dicot	Terrestrial
Coneflower, Tennessee Purple	*Echinacea tennesseensis*	Dicot	Terrestrial
Cordia bellonis (ncn)	*Cordia bellonis*	Dicot	Terrestrial
Coyote-thistle, Loch Lomond	*Eryngium constancei*	Dicot	Terrestrial
Cranichis Ricartii	*Cranichis ricartii*	Monocot	Terrestrial
Crownbeard, Big-leaved	*Verbesina dissita*	Dicot	Terrestrial
Crownscale, San Jacinto Valley	*Atriplex coronata var. notatior*	Dicot	Terrestrial
Cyanea undulata (ncn)	*Cyanea undulata*	Dicot	Terrestrial
Cycladenia, Jones	*Cycladenia jonesii (=humilis)*	Dicot	Terrestrial
Cypress, Gowen	*Cupressus goveniana ssp. goveniana*	Conf/cycds	Terrestrial

Conf/cycd Dicot Ferns Monocot

Cypress, Santa Cruz	*Cupressus abramsiana*	Conf/cycds	Terrestrial
Daisy, Lakeside	*Hymenoxys herbacea*	Dicot	Freshwater
Daisy, Parish's	*Erigeron parishii*	Dicot	Freshwater
Daisy, Willamette	*Erigeron decumbens var. decumbens*	Dicot	Terrestrial
Daphnopsis hellerana (ncn)	*Daphnopsis hellerana*	Dicot	Terrestrial
Dawn-flower, Texas Prairie (=Texas Bitterweed)	*Hymenoxys texana*	Dicot	Terrestrial
Delissea rhytodisperma (ncn)	*Delissea rhytidosperma*	Dicot	Terrestrial
Diellia erecta (ncn)	*Diellia erecta*	Ferns	Terrestrial
Diellia falcata (ncn)	*Diellia falcata*	Ferns	Terrestrial
Diellia pallida (ncn)	*Diellia pallida*	Ferns	Terrestrial
Diellia unisora (ncn)	*Diellia unisora*	Ferns	Terrestrial
Diplazium molokaiense (ncn)	*Diplazium molokaiense*	Ferns	Terrestrial
Dogweed, Ashy	*Thymophylla tephroleuca*	Dicot	Terrestrial
Dropwort, Canby's	*Oxypolis canbyi*	Dicot	Terrestrial, Freshwater
Dubautia latifolia (ncn)	*Dubautia latifolia*	Dicot	Terrestrial
Dubautia pauciflorula (ncn)	*Dubautia pauciflorula*	Dicot	Terrestrial
Dudleya, Conejo	*Dudleya abramsii ssp. parva*	Dicot	Terrestrial
Dudleya, Marcescent	*Dudleya cymosa ssp. marcescens*	Dicot	Terrestrial
Dudleya, Santa Clara Valley	*Dudleya setchellii*	Dicot	Terrestrial
Dudleya, Santa Cruz Island	*Dudleya nesiotica*	Dicot	Terrestrial
Dudleya, Santa Monica Mountains	*Dudleya cymosa ssp. ovatifolia*	Dicot	Terrestrial
Dudleya, Verity's	*Dudleya verityi*	Dicot	Terrestrial
Dwarf-flax, Marin	*Hesperolinon congestum*	Dicot	Terrestrial
Erubia	*Solanum drymophilum*	Dicot	Terrestrial
Eugenia Woodburyana	*Eugenia woodburyana*	Dicot	Terrestrial
Evening-primrose, Antioch Dunes	*Oenothera deltoides ssp. howellii*	Dicot	Terrestrial
Evening-primrose, Eureka Valley	*Oenothera avita ssp. eurekensis*	Dicot	Terrestrial
Evening-primrose, San Benito	*Camissonia benitensis*	Dicot	Terrestrial
Fern, Adiantum vivesii	*Adiantum vivesii*	Ferns	Terrestrial

Fern, Aleutian Shield	*Polystichum aleuticum*	Ferns	Terrestrial
Fern, American hart's-tongue	*Asplenium scolopendrium var. americanum*	Ferns	Terrestrial
Fern, Elaphoglossum serpens	*Elaphoglossum serpens*	Ferns	Terrestrial
Fern, Pendant Kihi (Adenophorus periens)	*Adenophorus periens*	Ferns	Terrestrial
Fern, Thelypteris inabonensis	*Thelypteris inabonensis*	Ferns	Terrestrial
Fern, Thelypteris verecunda	*Thelypteris verecunda*	Ferns	Terrestrial
Fern, Thelypteris yaucoensis	*Thelypteris yaucoensis*	Ferns	Terrestrial
Fiddleneck, Large-flowered	*Amsinckia grandiflora*	Dicot	Terrestrial
Flannelbush, Mexican	*Fremontodendron mexicanum*	Dicot	Terrestrial
Flannelbush, Pine Hill	*Fremontodendron californicum ssp. decumbens*	Dicot	Terrestrial
Fleabane, Zuni	*Erigeron rhizomatus*	Dicot	Terrestrial
Four-o'clock, Macfarlane's	*Mirabilis macfarlanei*	Dicot	Terrestrial
Frankenia, Johnston's	*Frankenia johnstonii*	Dicot	Terrestrial
Fringe Tree, Pygmy	*Chionanthus pygmaeus*	Dicot	Terrestrial
Fringepod, Santa Cruz Island	*Thysanocarpus conchuliferus*	Dicot	Terrestrial
Fritillary, Gentner's	*Fritillaria gentneri*	Monocot	Terrestrial
Fruit, Earth (=geocarpon)	*Geocarpon minimum*	Dicot	Terrestrial
Gahnia Lanaiensis (ncn)	*Gahnia lanaiensis*	Monocot	Terrestrial
Geranium, Hawaiian Red-flowered	*Geranium arboreum*	Dicot	Terrestrial
Gerardia, Sandplain	*Agalinis acuta*	Dicot	Terrestrial
Gesneria pauciflora (ncn)	*Gesneria pauciflora*	Dicot	Terrestrial
Gilia, Hoffmann's Slender-flowered	*Gilia tenuiflora ssp. hoffmannii*	Dicot	Terrestrial
Gilia, Monterey	*Gilia tenuiflora ssp. arenaria*	Dicot	Terrestrial
Goetzea, Beautiful (Matabuey)	*Goetzea elegans*	Dicot	Terrestrial
Golden Sunburst, Hartweg's	*Pseudobahia bahiifolia*	Dicot	Terrestrial
Goldenrod, Blue Ridge	*Solidago spithamaea*	Dicot	Terrestrial
Goldenrod, Houghton's	*Solidago houghtonii*	Dicot	Terrestrial
Goldenrod, Short's	*Solidago shortii*	Dicot	Terrestrial
Goldenrod, White-haired	*Solidago albopilosa*	Dicot	Terrestrial
Goldfields, Burke's	*Lasthenia burkei*	Dicot	Terrestrial

Goldfields, Contra Costa	*Lasthenia conjugens*	Dicot	Terrestrial
Gooseberry, Miccosukee	*Ribes echinellum*	Dicot	Terrestrial
Gouania hillebrandii (ncn)	*Gouania hillebrandii*	Dicot	Terrestrial
Gouania meyenii (ncn)	*Gouania meyenii*	Dicot	Terrestrial
Gouania vitifolia (ncn)	*Gouania vitifolia*	Dicot	Terrestrial
Gourd, Okeechobee	*Cucurbita okeechobeensis ssp. okeechobeensis*	Dicot	Terrestrial
Grass, California Orcutt	*Orcuttia californica*	Monocot	Vernal pool, Terrestrial
Grass, Colusa	*Neostapfia colusana*	Monocot	Vernal pool
Grass, Eureka Dune	*Swallenia alexandrae*	Monocot	Terrestrial
Grass, Fosberg's Love	*Eragrostis fosbergii*	Monocot	Terrestrial
Grass, Hairy Orcutt	*Orcuttia pilosa*	Dicot	Vernal pool
Grass, Sacramento Orcutt	*Orcuttia viscida*	Dicot	Vernal pool
Grass, San Joaquin Valley Orcutt	*Orcuttia inaequalis*	Monocot	Vernal pool
Grass, Slender Orcutt	*Orcuttia tenuis*	Dicot	Vernal pool
Grass, Solano	*Tuctoria mucronata*	Monocot	Vernal pool, Terrestrial
Grass, Tennessee Yellow-eyed	*Xyris tennesseensis*	Monocot	Terrestrial
Ground-plum, Guthrie's	*Astragalus bibullatus*	Dicot	Terrestrial
Groundsel, San Francisco Peaks	*Senecio franciscanus*	Dicot	Terrestrial
Gumplant, Ash Meadows	*Grindelia fraxino-pratensis*	Dicot	Terrestrial
Haha (Cyanea acuminata)	*Cyanea acuminata*	Dicot	Terrestrial
Haha (Cyanea asarifolia)	*Cyanea asarifolia*	Dicot	Terrestrial
Haha (Cyanea copelandii ssp. copelandii)	*Cyanea copelandii ssp. copelandii*	Dicot	Terrestrial
Haha (Cyanea copelandii ssp. haleakalaensis)	*Cyanea copelandii ssp. haleakalaensis*	Dicot	Terrestrial
Haha (Cyanea Crispa) (=Rollandia crispa)	*Cyanea (=Rollandia) crispa*	Dicot	Terrestrial
Haha (Cyanea dunbarii)	*Cyanea dunbarii*	Dicot	Terrestrial
Haha (Cyanea glabra)	*Cyanea glabra*	Dicot	Terrestrial
Haha (Cyanea grimesiana ssp. grimesiana)	*Cyanea grimesiana ssp. grimesiana*	Dicot	Terrestrial
Haha (Cyanea grimesiana ssp. obatae)	*Cyanea grimesiana ssp. obatae*	Dicot	Terrestrial
Haha (Cyanea hamatiflora ssp. carlsonii)	*Cyanea hamatiflora carlsonii*	Dicot	Terrestrial
Haha (Cyanea hamatiflora ssp. hamatiflora)	*Cyanea hamatiflora ssp. hamatiflora*	Dicot	Terrestrial

Haha (Cyanea humboldtiana)	*Cyanea humboldtiana*	Dicot	Terrestrial
Haha (Cyanea koolauensis)	*Cyanea koolauensis*	Dicot	Terrestrial
Haha (Cyanea longiflora)	*Cyanea longiflora*	Dicot	Terrestrial
Haha (Cyanea Macrostegia var. gibsonii)	*Cyanea macrostegia ssp. gibsonii*	Dicot	Terrestrial
Haha (Cyanea mannii)	*Cyanea mannii*	Dicot	Terrestrial
Haha (Cyanea mceldowneyi)	*Cyanea mceldowneyi*	Dicot	Terrestrial
Haha (Cyanea pinnatifida)	*Cyanea pinnatifida*	Dicot	Terrestrial
Haha (Cyanea platyphylla)	*Cyanea platyphylla*	Dicot	Terrestrial
Haha (Cyanea procera)	*Cyanea procera*	Dicot	Terrestrial
Haha (Cyanea recta)	*Cyanea recta*	Dicot	Terrestrial
Haha (Cyanea remyi)	*Cyanea remyi*	Dicot	Terrestrial
Haha (Cyanea shipmanii)	*Cyanea shipmannii*	Dicot	Terrestrial
Haha (Cyanea stictophylla)	*Cyanea stictophylla*	Dicot	Terrestrial
Haha (Cyanea St-Johnii) (=Rollandia St-Johnii)	*Cyanea st-johnii*	Dicot	Terrestrial
Haha (Cyanea superba)	*Cyanea superba*	Dicot	Terrestrial
Ha'Iwale (Cyrtandra crenata)	*Cyrtandra crenata*	Dicot	Terrestrial
Ha'Iwale (Cyrtandra dentata)	*Cyrtandra dentata*	Dicot	Terrestrial
Ha'Iwale (Cyrtandra giffardii)	*Cyrtandra giffardii*	Dicot	Terrestrial
Ha'Iwale (Cyrtandra limahuliensis)	*Cyrtandra limahuliensis*	Dicot	Terrestrial
Ha'Iwale (Cyrtandra munroi)	*Cyrtandra munroi*	Dicot	Terrestrial
Ha'Iwale (Cyrtandra polyantha)	*Cyrtandra polyantha*	Dicot	Terrestrial
Ha'Iwale (Cyrtandra subumbellata)	*Cyrtandra subumbellata*	Dicot	Terrestrial
Ha'Iwale (Cyrtandra tintinnabula)	*Cyrtandra tintinnabula*	Dicot	Terrestrial
Ha'Iwale (Cyrtandra viridiflora)	*Cyrtandra viridiflora*	Dicot	Terrestrial
Hala Pepe (Pleomele hawaiiensis)	*Pleomele hawaiiensis*	Monocot	Terrestrial
Haplostachys Haplostachya (ncn)	*Haplostachys haplostachya*	Dicot	Terrestrial
Harebells, Avon Park	*Crotalaria avonensis*	Dicot	Terrestrial
Harperella	*Ptilimnium nodosum*	Dicot	Freshwater
Hau Kauhiwi (Hibiscadelphus woodi)	*Hibiscadelphus woodii*	Dicot	Terrestrial

Hau Kuahiwi (Hibiscadelphus distans)	*Hibiscadelphus distans*	Dicot	Terrestrial
Heartleaf, Dwarf-flowered	*Hexastylis naniflora*	Dicot	Terrestrial
Heather, Mountain Golden	*Hudsonia montana*	Dicot	Terrestrial
Heau (Exocarpos luteolus)	*Exocarpos luteolus*	Dicot	Terrestrial
Hedyotis degeneri (ncn)	*Hedyotis degeneri*	Dicot	Terrestrial
Hedyotis parvula (ncn)	*Hedyotis parvula*	Dicot	Terrestrial
Hedyotis St.-Johnii (ncn)	*Hedyotis st.-johnii*	Dicot	Terrestrial
Hesperomannia arborescens (ncn)	*Hesperomannia arborescens*	Dicot	Terrestrial
Hesperomannia arbuscula (ncn)	*Hesperomannia arbuscula*	Dicot	Terrestrial
Hesperomannia lydgatei (ncn)	*Hesperomannia lydgatei*	Dicot	Terrestrial
Hibiscus, Clay's	*Hibiscus clayi*	Dicot	Terrestrial
Higuero De Sierra	*Crescentia portoricensis*	Dicot	Terrestrial
Hilo Ischaemum (Ischaemum byrone)	*Ischaemum byrone*	Monocot	Terrestrial
Holei (Ochrosia kilaueaensis)	*Ochrosia kilaueaensis*	Dicot	Terrestrial
Holly, Cook's	*Ilex cookii*	Dicot	Terrestrial
Howellia, Water	*Howellia aquatilis*	Dicot	Freshwater
Hypericum, Highlands Scrub	*Hypericum cumulicola*	Dicot	Terrestrial
'Ihi'Ihi (Marsilea villosa)	*Marsilea villosa*	Ferns	Vernal pool, Terrestrial
Ilex sintenisii (ncn)	*Ilex sintenisii*	Dicot	Terrestrial
Iliau (Wilkesia hobdyi)	*Wilkesia hobdyi*	Dicot	Terrestrial
Ipomopsis, Holy Ghost	*Ipomopsis sancti-spiritus*	Dicot	Terrestrial
Iris, Dwarf Lake	*Iris lacustris*	Monocot	Terrestrial
Irisette, White	*Sisyrinchium dichotomum*	Monocot	Terrestrial
Ivesia, Ash Meadows	*Ivesia kingii var. eremica*	Dicot	Terrestrial
Jacquemontia, Beach	*Jacquemontia reclinata*	Dicot	Terrestrial, Coastal (neritic)
Jewelflower, California	*Caulanthus californicus*	Dicot	Terrestrial
Jewelflower, Tiburon	*Streptanthus niger*	Dicot	Terrestrial
Joint-vetch, Sensitive	*Aeschynomene virginica*	Dicot	Terrestrial, Brackish
Kamakahala (Labordia cyrtandrae)	*Labordia cyrtandrae*	Dicot	Terrestrial
Kamakahala (Labordia lydgatei)	*Labordia lydgatei*	Dicot	Terrestrial

Kamakahala (Labordia tinifolia var. lanaiensis)	*Labordia tinifolia var. lanaiensis*	Dicot	Terrestrial
Kamakahala (Labordia tinifolia var. wahiawaen)	*Labordia tinifolia var. wahiawaensis*	Dicot	Terrestrial
Kamakahala (Labordia triflora)	*Labordia triflora*	Dicot	Terrestrial
Kamanomano (Cenchrus agrimonioides)	*Cenchrus agrimonioides*	Monocot	Terrestrial
Kanaloa kahoolawensis (ncn)	*Kanaloa kahoolawensis*	Dicot	Terrestrial
Kauila (Colubrina oppositifolia)	*Colubrina oppositifolia*	Dicot	Terrestrial
Kaulu (Pteralyxia kauaiensis)	*Pteralyxia kauaiensis*	Dicot	Terrestrial
Kio'Ele (Hedyotis coriacea)	*Hedyotis coriacea*	Dicot	Terrestrial
Kiponapona (Phyllostegia racemosa)	*Phyllostegia racemosa*	Dicot	Terrestrial
Koki'o (Kokia drynarioides)	*Kokia drynarioides*	Dicot	Terrestrial
Koki'o (Kokia kauaiensis)	*Kokia kauaiensis*	Dicot	Terrestrial
Koki'o Ke'oke'o (Hibiscus arnottianus ssp. immaculatus)	*Hibiscus arnottianus ssp. immaculatus*	Dicot	Terrestrial
Koki'o Ke'oke'o (Hibiscus waimeae ssp. hannerae)	*Hibiscus waimeae ssp. hannerae*	Dicot	Terrestrial
Kolea (Myrsine juddii)	*Myrsine juddii*	Dicot	Terrestrial
Kolea (Myrsine linearifolia)	*Myrsine linearifolia*	Dicot	Terrestrial
Ko'oko'olau (Bidens micrantha ssp. kalealaha)	*Bidens micrantha ssp. kalealaha*	Dicot	Terrestrial
Ko'oko'olau (Bidens wiebkei)	*Bidens wiebkei*	Dicot	Terrestrial
Ko'oloa'ula (Abutilon menziesii)	*Abutilon menziesii*	Dicot	Terrestrial
Kopa (Hedyotis schlechtendahliana var. remyi)	*Hedyotis schlechtendahliana var. remyi*	Dicot	Terrestrial
Kuawawaenohu (Alsinidendron lychnoides)	*Alsinidendron lychnoides*	Dicot	Terrestrial
Kulu'I (Nototrichium humile)	*Nototrichium humile*	Dicot	Terrestrial
Ladies'-tresses, Canelo Hills	*Spiranthes delitescens*	Monocot	Terrestrial
Ladies'-tresses, Navasota	*Spiranthes parksii*	Monocot	Terrestrial
Ladies'-tresses, Ute	*Spiranthes diluvialis*	Monocot	Terrestrial
Larkspur, Baker's	*Delphinium bakeri*	Dicot	Terrestrial
Larkspur, San Clemente Island	*Delphinium variegatum ssp. kinkiense*	Dicot	Terrestrial
Larkspur, Yellow	*Delphinium luteum*	Dicot	Terrestrial
Lau'ehu (Panicum niihauense)	*Panicum niihauense*	Monocot	Terrestrial

Laukahi Kuahiwi (Plantago hawaiensis)	*Plantago hawaiensis*	Dicot	Terrestrial
Laukahi Kuahiwi (Plantago princeps)	*Plantago princeps*	Dicot	Terrestrial
Laulihilihi (Schiedea stellarioides)	*Schiedea stellarioides*	Dicot	Terrestrial
Layia, Beach	*Layia carnosa*	Dicot	Terrestrial, Coastal (neritic)
Lead-plant, Crenulate	*Amorpha crenulata*	Dicot	Terrestrial
Leather-flower, Alabama	*Clematis socialis*	Dicot	Terrestrial
Leather-flower, Morefield's	*Clematis morefieldii*	Dicot	Terrestrial
Lepanthes eltorensis (ncn)	*Lepanthes eltoroensis*	Monocot	Terrestrial
Lessingia, San Francisco	*Lessingia germanorum (=L.g. var. germanorum)*	Dicot	Terrestrial
Lily, Minnesota Trout	*Erythronium propullans*	Monocot	Terrestrial
Lily, Pitkin Marsh	*Lilium pardalinum ssp. pitkinense*	Monocot	Freshwater
Lily, Western	*Lilium occidentale*	Monocot	Terrestrial
Lipochaeta venosa (ncn)	*Lipochaeta venosa*	Dicot	Terrestrial
Liveforever, Laguna Beach	*Dudleya stolonifera*	Dicot	Terrestrial
Liveforever, Santa Barbara Island	*Dudleya traskiae*	Dicot	Terrestrial
Lo`ulu (Pritchardia affinis)	*Pritchardia affinis*	Monocot	Terrestrial
Lo`ulu (Pritchardia kaalae)	*Pritchardia kaalae*	Monocot	Terrestrial
Lo`ulu (Pritchardia munroi)	*Pritchardia munroi*	Monocot	Terrestrial
Lo`ulu (Pritchardia napaliensis)	*Pritchardia napaliensis*	Monocot	Terrestrial
Lo`ulu (Pritchardia remota)	*Pritchardia remota*	Monocot	Terrestrial
Lo`ulu (Pritchardia schattaueri)	*Pritchardia schattaueri*	Monocot	Terrestrial
Lo`ulu (Pritchardia viscosa)	*Pritchardia viscosa*	Monocot	Terrestrial
Lobelia monostachya (ncn)	*Lobelia monostachya*	Dicot	Terrestrial
Lobelia niihauensis (ncn)	*Lobelia niihauensis*	Dicot	Terrestrial
Lobelia oahuensis (ncn)	*Lobelia oahuensis*	Dicot	Terrestrial
Locoweed, Fassett's	*Oxytropis campestris var. chartacea*	Dicot	Terrestrial
Lomatium, Bradshaw's	*Lomatium bradshawii*	Dicot	Terrestrial, Freshwater
Lomatium, Cook's	*Lomatium cookii*	Dicot	Vernal pool
Loosestrife, Rough-leaved	*Lysimachia asperulaefolia*	Dicot	Terrestrial
Lousewort, Furbish	*Pedicularis furbishiae*	Dicot	Terrestrial

Lupine, Clover	*Lupinus tidestromii*	Dicot	Coastal (neritic)
Lupine, Kincaid's	*Lupinus sulphureus (=oreganus) ssp. kincaidii (=var. kincaidii)*	Dicot	Terrestrial
Lupine, Nipomo Mesa	*Lupinus nipomensis*	Dicot	Coastal (neritic)
Lupine, Scrub	*Lupinus aridorum*	Dicot	Terrestrial
Lyonia truncata var. proctorii (ncn)	*Lyonia truncata var. proctorii*	Dicot	Terrestrial
Lysimachia filifolia (ncn)	*Lysimachia filifolia*	Dicot	Terrestrial
Lysimachia lydgatei (ncn)	*Lysimachia lydgatei*	Dicot	Terrestrial
Lysimachia maxima (ncn)	*Lysimachia maxima*	Dicot	Terrestrial
Mahoe (Alectryon macrococcus)	*Alectryon macrococcus*	Dicot	Terrestrial
Makou (Peucedanum sandwicense)	*Peucedanum sandwicense*	Dicot	Terrestrial
Malacothrix, Island	*Malacothrix squalida*	Dicot	Terrestrial
Malacothrix, Santa Cruz Island	*Malacothrix indecora*	Dicot	Terrestrial
Mallow, Kern	*Eremalche kernensis*	Dicot	Terrestrial
Manaca, palma de	*Calyptronoma rivalis*	Monocot	Terrestrial
Manioc, Walker's	*Manihot walkerae*	Dicot	Terrestrial
Manzanita, Del Mar	*Arctostaphylos glandulosa ssp. crassifolia*	Dicot	Terrestrial
Manzanita, Ione	*Arctostaphylos myrtifolia*	Dicot	Terrestrial
Manzanita, Morro	*Arctostaphylos morroensis*	Dicot	Terrestrial
Manzanita, Pallid	*Arctostaphylos pallida*	Dicot	Terrestrial
Manzanita, Santa Rosa Island	*Arctostaphylos confertiflora*	Dicot	Terrestrial
Ma'o Hau Hele (Hibiscus brackenridgei)	*Hibiscus brackenridgei*	Dicot	Terrestrial
Ma'oli'oli (Schiedea apokremnos)	*Schiedea apokremnos*	Dicot	Terrestrial
Ma'oli'oli (Schiedea kealiae)	*Schiedea kealiae*	Dicot	Terrestrial
Mapele (Cyrtandra cyaneoides)	*Cyrtandra cyaneoides*	Dicot	Terrestrial
Mariscus fauriei (ncn)	*Mariscus fauriei*	Monocot	Terrestrial
Mariscus pennatiformis (ncn)	*Mariscus pennatiformis*	Monocot	Terrestrial
Meadowfoam, Butte County	*Limnanthes floccosa ssp. californica*	Dicot	Vernal pool
Meadowfoam, Large-flowered Woolly	*Limnanthes floccosa ssp. Grandiflora*	Dicot	Vernal pool
Meadowfoam, Sebastopol	*Limnanthes vinculans*	Dicot	Freshwater, Terrestrial

Meadowrue, Cooley's	*Thalictrum cooleyi*	Dicot	Terrestrial
Mehamehame (Flueggea neowawraea)	*Flueggea neowawraea*	Dicot	Terrestrial
Milkpea, Small's	*Galactia smallii*	Dicot	Terrestrial
Milk-vetch, Applegate's	*Astragalus applegatei*	Dicot	Terrestrial
Milk-vetch, Ash Meadows	*Astragalus phoenix*	Dicot	Terrestrial
Milk-vetch, Braunton's	*Astragalus brauntonii*	Dicot	Terrestrial
Milk-vetch, Clara Hunt's	*Astragalus clarianus*	Dicot	Terrestrial
Milk-vetch, Coachella Valley	*Astragalus lentiginosus var. coachellae*	Dicot	Terrestrial
Milk-vetch, Coastal Dunes	*Astragalus tener var. titi*	Dicot	Terrestrial
Milk-vetch, Cushenbury	*Astragalus albens*	Dicot	Terrestrial
Milk-vetch, Deseret	*Astragalus desereticus*	Dicot	Terrestrial
Milk-vetch, Fish Slough	*Astragalus lentiginosus var. piscinensis*	Dicot	Terrestrial
Milk-vetch, Holmgren	*Astragalus holmgreniorum*	Dicot	Terrestrial
Milk-vetch, Jesup's	*Astragalus robbinsii var. jesupi*	Dicot	Terrestrial
Milk-vetch, Lane Mountain	*Astragalus jaegerianus*	Dicot	Terrestrial
Milk-vetch, Mancos	*Astragalus humillimus*	Dicot	Terrestrial
Milk-vetch, Osterhout	*Astragalus osterhoutii*	Dicot	Terrestrial
Milk-vetch, Pierson's	*Astragalus magdalenae var. peirsonii*	Dicot	Terrestrial
Milk-vetch, Sentry	*Astragalus cremnophylax var. cremnophylax*	Dicot	Terrestrial
Milk-vetch, Shivwits	*Astragalus ampullarioides*	Dicot	Terrestrial
Milk-vetch, Triple-ribbed	*Astragalus tricarinatus*	Dicot	Terrestrial
Milk-vetch, Ventura Marsh	*Astragalus pycnostachyus var. lanosissimus*	Dicot	Terrestrial, Freshwater
Milkweed, Mead's	*Asclepias meadii*	Dicot	Terrestrial
Milkweed, Welsh's	*Asclepias welshii*	Dicot	Terrestrial
Mint, Garrett's	*Dicerandra christmanii*	Dicot	Terrestrial
Mint, Lakela's	*Dicerandra immaculata*	Dicot	Terrestrial
Mint, Longspurred	*Dicerandra cornutissima*	Dicot	Terrestrial
Mint, Otay Mesa	*Pogogyne nudiuscula*	Dicot	Terrestrial
Mint, San Diego Mesa	*Pogogyne abramsii*	Dicot	Terrestrial
Mint, Scrub	*Dicerandra frutescens*	Dicot	Terrestrial

Mitracarpus Maxwelliae	*Mitracarpus maxwelliae*	Dicot	Terrestrial
Mitracarpus Polycladus	*Mitracarpus polycladus*	Dicot	Terrestrial
Monardella, Willowy	*Monardella linoides ssp. viminea*	Dicot	Terrestrial
Monkey-flower, Michigan	*Mimulus glabratus var. michiganensis*	Dicot	Terrestrial, Freshwater
Monkshood, Northern Wild	*Aconitum noveboracense*	Dicot	Terrestrial
Morning-glory, Stebbins	*Calystegia stebbinsii*	Dicot	Terrestrial
Mountainbalm, Indian Knob	*Eriodictyon altissimum*	Dicot	Terrestrial
Mountain-mahogany, Catalina Island	*Cercocarpus traskiae*	Dicot	Terrestrial
Munroidendron racemosum (ncn)	*Munroidendron racemosum*	Dicot	Terrestrial
Mustard, Carter's	*Warea carteri*	Dicot	Terrestrial
Mustard, Slender-petaled	*Thelypodium stenopetalum*	Dicot	Terrestrial
Myrcia Paganii	*Myrcia paganii*	Dicot	Terrestrial
Na'ena'e (Dubautia herbstobatae)	*Gopherus polyphemus*	Dicot	Terrestrial
Na'ena'e (Dubautia plantaginea ssp. humilis)	*Dubautia plantaginea ssp. humilis*	Dicot	Terrestrial
Nani Wai'ale'ale (Viola kauaensis var. wahiawaensis)	*Viola kauaiensis var. wahiawaensis*	Dicot	Terrestrial
Nanu (Gardenia mannii)	*Gardenia mannii*	Dicot	Terrestrial
Na'u (Gardenia brighamii)	*Gardenia brighamii*	Dicot	Terrestrial
Naupaka, Dwarf (Scaevola coriacea)	*Scaevola coriacea*	Dicot	Terrestrial
Navarretia, Few-flowered	*Navarretia leucocephala ssp. pauciflora (=N. pauciflora)*	Dicot	Vernal pool, Terrestrial
Navarretia, Many-flowered	*Navarretia leucocephala ssp. plieantha*	Dicot	Terrestrial, Vernal pool
Navarretia, Spreading	*Navarretia fossalis*	Dicot	Vernal pool
Nehe (Lipochaeta fauriei)	*Lipochaeta fauriei*	Dicot	Terrestrial
Nehe (Lipochaeta kamolensis)	*Lipochaeta kamolensis*	Dicot	Terrestrial
Nehe (Lipochaeta lobata var. leptophylla)	*Lipochaeta lobata var. leptophylla*	Dicot	Terrestrial
Nehe (Lipochaeta micrantha)	*Lipochaeta micrantha*	Dicot	Terrestrial
Nehe (Lipochaeta tenuifolia)	*Lipochaeta tenuifolia*	Dicot	Terrestrial
Nehe (Lipochaeta waimeaensis)	*Lipochaeta waimeaensis*	Dicot	Terrestrial
Neraudia angulata (ncn)	*Neraudia angulata*	Dicot	Terrestrial
Neraudia ovata (ncn)	*Neraudia ovata*	Dicot	Terrestrial

Neraudia sericea (ncn)	*Neraudia sericea*	Dicot	Terrestrial
Nioi (Eugenia koolauensis)	*Eugenia koolauensis*	Dicot	Terrestrial
Niterwort, Amargosa	*Nitrophila mohavensis*	Dicot	Terrestrial
Nohoanu (Geranium multiflorum)	*Geranium multiflorum*	Dicot	Terrestrial
Oak, Hinckley	*Quercus hinckleyi*	Dicot	Terrestrial
'Oha (Delissea rivularis)	*Delissea rivularis*	Dicot	Terrestrial
'Oha (Delissea subcordata)	*Delissea subcordata*	Dicot	Terrestrial
'Oha (Delissea undulata)	*Delissea undulata*	Dicot	Terrestrial
'Oha (Lobelia gaudichaudii koolauensis)	*Lobelia gaudichaudii ssp. koolauensis*	Dicot	Terrestrial
'Oha Wai (Clermontia drepanomorpha)	*Clermontia drepanomorpha*	Dicot	Terrestrial
'Oha Wai (Clermontia lindseyana)	*Clermontia lindseyana*	Dicot	Terrestrial
'Oha Wai (Clermontia oblongifolia ssp. brevipes)	*Clermontia oblongifolia ssp. brevipes*	Dicot	Terrestrial
'Oha Wai (Clermontia oblongifolia ssp. mauiensis)	*Clermontia oblongifolia ssp. mauiensis*	Dicot	Terrestrial
'Oha Wai (Clermontia peleana)	*Clermontia peleana*	Dicot	Terrestrial
'Oha Wai (Clermontia pyrularia)	*Clermontia pyrularia*	Dicot	Terrestrial
'Oha Wai (Clermontia samuelii)	*Clermontia samuelii*	Dicot	Terrestrial
'Ohai (Sesbania tomentosa)	*Sesbania tomentosa*	Dicot	Terrestrial
'Ohe'ohe (Tetraplasandra gymnocarpa)	*Tetraplasandra gymnocarpa*	Dicot	Terrestrial
'Olulu (Brighamia insignis)	*Brighamia insignis*	Dicot	Terrestrial
Onion, Munz's	*Allium munzii*	Monocot	Terrestrial
Opuhe (Urera kaalae)	*Urera kaalae*	Dicot	Terrestrial
Orchid, Eastern Prairie Fringed	*Platanthera leucophaea*	Monocot	Terrestrial
Orchid, Western Prairie Fringed	*Platanthera praeclara*	Monocot	Terrestrial
Oxytheca, Cushenbury	*Oxytheca parishii var. goodmaniana*	Dicot	Terrestrial
Paintbrush, Ash-grey Indian	*Castilleja cinerea*	Dicot	Terrestrial
Paintbrush, Golden	*Castilleja levisecta*	Dicot	Terrestrial
Paintbrush, San Clemente Island Indian	*Castilleja grisea*	Dicot	Terrestrial
Paintbrush, Soft-leaved	*Castilleja mollis*	Dicot	Terrestrial
Paintbrush, Tiburon	*Castilleja affinis ssp. neglecta*	Dicot	Terrestrial

Palo Colorado (Ternstroemia luquillensis)	*Ternstroemia luquillensis*	Dicot	Terrestrial
Palo de Jazmin	*Styrax portoricensis*	Dicot	Terrestrial
Palo de Nigua	*Cornutia obovata*	Dicot	Terrestrial
Palo de Ramon	*Banara vanderbiltii*	Dicot	Terrestrial
Palo de Rosa	*Ottoschulzia rhodoxylon*	Dicot	Terrestrial
Pamakani (Viola chamissoniana ssp. chamissoniana)	*Viola chamissoniana ssp. chamissoniana*	Dicot	Terrestrial
Panicgrass, Carter's (Panicum fauriei var.carteri)	*Panicum fauriei var. carteri*	Monocot	Terrestrial
Pauoa (Ctenitis squamigera)	*Ctenitis squamigera*	Ferns	Terrestrial
Pawpaw, Beautiful	*Deeringothamnus pulchellus*	Dicot	Terrestrial
Pawpaw, Four-petal	*Asimina tetramera*	Dicot	Terrestrial
Pawpaw, Rugel's	*Deeringothamnus rugelii*	Dicot	Terrestrial
Pelos del Diablo	*Aristida portoricensis*	Monocot	Terrestrial
Penny-cress, Kneeland Prairie	*Thlaspi californicum*	Dicot	Terrestrial
Pennyroyal, Todsen's	*Hedeoma todsenii*	Dicot	Terrestrial
Pentachaeta, Lyon's	*Pentachaeta lyonii*	Dicot	Terrestrial
Pentachaeta, White-rayed	*Pentachaeta bellidiflora*	Dicot	Terrestrial
Peperomia, Wheeler's	*Peperomia wheeleri*	Dicot	Terrestrial
Phacelia, Clay	*Phacelia argillacea*	Dicot	Terrestrial
Phacelia, Island	*Phacelia insularis ssp. insularis*	Dicot	Terrestrial
Phlox, Texas Trailing	*Phlox nivalis ssp. texensis*	Dicot	Terrestrial
Phlox, Yreka	*Phlox hirsuta*	Dicot	Terrestrial
Phyllostegia hirsuta (ncn)	*Phyllostegia hirsuta*	Dicot	Terrestrial
Phyllostegia kaalaensis (ncn)	*Phyllostegia kaalaensis*	Dicot	Terrestrial
Phyllostegia knudsenii (ncn)	*Phyllostegia knudsenii*	Dicot	Terrestrial
Phyllostegia mannii (ncn)	*Phyllostegia mannii*	Dicot	Terrestrial
Phyllostegia mollis (ncn)	*Phyllostegia mollis*	Dicot	Terrestrial
Phyllostegia parviflora (ncn)	*Phyllostegia parviflora*	Dicot	Terrestrial
Phyllostegia velutina (ncn)	*Phyllostegia velutina*	Dicot	Terrestrial
Phyllostegia waimeae (ncn)	*Phyllostegia waimeae*	Dicot	Terrestrial

Phyllostegia warshaueri (ncn)	*Phyllostegia warshaueri*	Dicot	Terrestrial
Phyllostegia wawrana (ncn)	*Phyllostegia wawrana*	Dicot	Terrestrial
Pilo (Hedyotis mannii)	*Hedyotis mannii*	Dicot	Terrestrial
Pink, Swamp	*Helonias bullata*	Monocot	Terrestrial, Freshwater
Pinkroot, Gentian	*Spigelia gentianoides*	Dicot	Terrestrial
Piperia, Yadon's	*Piperia yadonii*	Monocot	Terrestrial
Pitaya, Davis' Green	*Echinocereus viridiflorus var. davisii*	Dicot	Terrestrial
Pitcher-plant, Alabama Canebrake	*Sarracenia rubra alabamensis*	Dicot	Freshwater, Terrestrial
Pitcher-plant, Green	*Sarracenia oreophila*	Dicot	Terrestrial, Freshwater
Pitcher-plant, Mountain Sweet	*Sarracenia rubra ssp. jonesii*	Dicot	Freshwater, Terrestrial
Platanthera holochila (ncn)	*Platanthera holochila*	Monocot	Terrestrial
Plum, Scrub	*Prunus geniculata*	Dicot	Terrestrial
Poa siphonoglossa (ncn)	*Poa siphonoglossa*	Monocot	Terrestrial
Po'e (Portulaca sclerocarpa)	*Portulaca sclerocarpa*	Dicot	Terrestrial
Pogonia, Small Whorled	*Isotria medeoloides*	Monocot	Terrestrial
Polygala, Lewton's	*Polygala lewtonii*	Dicot	Terrestrial
Polygala, Tiny	*Polygala smallii*	Dicot	Terrestrial
Polygonum, Scott's Valley	*Polygonum hickmanii*	Dicot	Terrestrial
Polystichum calderonense (ncn)	*Polystichum calderonense*	Ferns	Terrestrial
Pondberry	*Lindera melissifolia*	Dicot	Terrestrial
Popcornflower, Rough	*Plagiobothrys hirtus*	Dicot	Vernal pool
Popolo 'Aiakeakua (Solanum sandwicense)	*Solanum sandwicense*	Dicot	Terrestrial
Popolo Ku Mai (Solanum incompletum)	*Solanum incompletum*	Dicot	Terrestrial
Poppy, Sacramento Prickly	*Argemone pleiacantha ssp. pinnatisecta*	Dicot	Terrestrial
Poppy-mallow, Texas	*Callirhoe scabriuscula*	Dicot	Terrestrial
Potato-bean, Price's	*Apios priceana*	Dicot	Terrestrial
Potentilla, Hickman's	*Potentilla hickmanii*	Dicot	Terrestrial
Prickly-apple, Fragrant	*Cereus eriophorus var. fragrans*	Dicot	Terrestrial
Prickly-ash, St. Thomas	*Zanthoxylum thomasianum*	Dicot	Terrestrial
Primrose, Maguire	*Primula maguirei*	Dicot	Terrestrial

Pteris lidgatei (ncn)	*Pteris lidgatei*	Ferns	Terrestrial
Pua'ala (Brighamia rockii)	*Brighamia rockii*	Dicot	Terrestrial
Pussypaws, Mariposa	*Calyptridium pulchellum*	Dicot	Terrestrial
Pu'uka'a (Cyperus trachysanthos)	*Cyperus trachysanthos*	Monocot	Terrestrial
Quillwort, Black-spored	*Isoetes melanospora*	Ferns	Vernal pool
Quillwort, Louisiana	*Isoetes louisianensis*	Ferns	Freshwater, Terrestrial
Quillwort, Mat-forming	*Isoetes tegetiformans*	Ferns	Vernal pool
Rattleweed, Hairy	*Baptisia arachnifera*	Dicot	Terrestrial
Reed-mustard, Clay	*Schoenocrambe argillacea*	Dicot	Terrestrial
Reed-mustard, Shrubby	*Schoenocrambe suffrutescens*	Dicot	Terrestrial
Remya kauaiensis (ncn)	*Remya kauaiensis*	Dicot	Terrestrial
Remya montgomeryi (ncn)	*Remya montgomeryi*	Dicot	Terrestrial
Remya, Maui	*Remya mauiensis*	Dicot	Terrestrial
Rhododendron, Chapman	*Rhododendron chapmanii*	Dicot	Terrestrial
Ridge-cress (=Pepper-cress), Barneby	*Lepidium barnebyanum*	Dicot	Terrestrial
Rock-cress, Hoffmann's	*Arabis hoffmannii*	Dicot	Terrestrial
Rock-cress, Large (=Braun's)	*Arabis perstellata E. L. Braun var. ampla Rollins*	Dicot	Terrestrial
Rock-cress, McDonald's	*Arabis mcdonaldiana*	Dicot	Terrestrial
Rock-cress, Santa Cruz Island	*Sibara filifolia*	Dicot	Terrestrial
Rock-cress, Shale Barren	*Arabis serotina*	Dicot	Terrestrial
Rock-cress, Small	*Arabis perstellata E. L. Braun var. perstellata Fernald*	Dicot	Terrestrial
Rosemary, Cumberland	*Conradina verticillata*	Dicot	Terrestrial
Rosemary, Etonia	*Conradina etonia*	Dicot	Terrestrial
Rosemary, Short-leaved	*Conradina brevifolia*	Dicot	Terrestrial
Roseroot, Leedy's	*Sedum integrifolium ssp. leedyi*	Dicot	Terrestrial
Rush-rose, Island	*Helianthemum greenei*	Dicot	Terrestrial
Sandalwood, Lanai (='Iliahi)	*Santalum freycinetianum var. lanaiense*	Dicot	Terrestrial
Sandlace	*Polygonella myriophylla*	Dicot	Terrestrial
Sand-verbena, Large-fruited	*Abronia macrocarpa*	Dicot	Terrestrial

Sandwort, Bear Valley	*Arenaria ursina*	Dicot	Terrestrial
Sandwort, Cumberland	*Arenaria cumberlandensis*	Dicot	Terrestrial
Sandwort, Marsh	*Arenaria paludicola*	Dicot	Freshwater, Terrestrial
Sanicula mariversa (ncn)	*Sanicula mariversa*	Dicot	Terrestrial
Sanicula purpurea (ncn)	*Sanicula purpurea*	Dicot	Terrestrial
Schiedea haleakalensis (ncn)	*Schiedea haleakalensis*	Dicot	Terrestrial
Schiedea helleri (ncn)	*Schiedea helleri*	Dicot	Terrestrial
Schiedea hookeri (ncn)	*Schiedea hookeri*	Dicot	Terrestrial
Schiedea kaalae (ncn)	*Schiedea kaalae*	Dicot	Terrestrial
Schiedea kauaiensis (ncn)	*Schiedea kauaiensis*	Dicot	Terrestrial
Schiedea lydgatei (ncn)	*Schiedea lydgatei*	Dicot	Terrestrial
Schiedea membranacea (ncn)	*Schiedea membranacea*	Dicot	Terrestrial
Schiedea nuttallii (ncn)	*Schiedea nuttallii*	Dicot	Terrestrial
Schiedea sarmentosa (ncn)	*Schiedea sarmentosa*	Dicot	Terrestrial
Schiedea spergulina var. leiopoda (ncn)	*Schiedea spergulina var. leiopoda*	Dicot	Terrestrial
Schiedea spergulina var. spergulina (ncn)	*Schiedea spergulina var. spergulina*	Dicot	Terrestrial
Schiedea verticillata (ncn)	*Schiedea verticillata*	Dicot	Terrestrial
Schiedea, Diamond Head (Schiedea adamantis)	*Schiedea adamantis*	Dicot	Terrestrial
Schoepfia arenaria (ncn)	*Schoepfia arenaria*	Dicot	Terrestrial
Sea-blite, California	*Suaeda californica*	Dicot	Terrestrial
Seagrass, Johnson's	*Halophila johnsonii*	Monocot	Coastal (neritic), Saltwater
Sedge, Golden	*Carex lutea*	Monocot	Terrestrial
Sedge, Navajo	*Carex specuicola*	Monocot	Terrestrial
Sedge, White	*Carex albida*	Monocot	Freshwater, Terrestrial
Silene alexandri (ncn)	*Silene alexandri*	Dicot	Terrestrial
Silene hawaiiensis (ncn)	*Silene hawaiiensis*	Dicot	Terrestrial
Silene lanceolata (ncn)	*Silene lanceolata*	Dicot	Terrestrial
Silene perlmanii (ncn)	*Silene perlmanii*	Dicot	Terrestrial
Silversword, Haleakala ('Ahinahina)	*Argyroxiphium sandwicense ssp. macrocephalum*	Dicot	Terrestrial

Silversword, Ka'u (Argyroxiphium kauense)	*Argyroxiphium kauense*	Dicot	Terrestrial
Silversword, Mauna Kea ('Ahinahina)	*Argyroxiphium sandwicense ssp. sandwicense*	Dicot	Terrestrial
Skullcap, Large-flowered	*Scutellaria montana*	Dicot	Terrestrial
Snakeroot	*Eryngium cuneifolium*	Dicot	Terrestrial
Sneezeweed, Virginia	*Helenium virginicum*	Dicot	Vernal pool
Snowbells, Texas	*Styrax texanus*	Dicot	Terrestrial
Spermolepis hawaiiensis (ncn)	*Spermolepis hawaiiensis*	Dicot	Terrestrial
Spineflower, Ben Lomond	*Chorizanthe pungens var. hartwegiana*	Dicot	Terrestrial
Spineflower, Howell's	*Chorizanthe howellii*	Dicot	Terrestrial
Spineflower, Monterey	*Chorizanthe pungens var. pungens*	Dicot	Terrestrial
Spineflower, Orcutt's	*Chorizanthe orcuttiana*	Dicot	Terrestrial
Spineflower, Robust	*Chorizanthe robusta var. robusta*	Dicot	Terrestrial
Spineflower, Scotts Valley	*Chorizanthe robusta var. hartwegii*	Dicot	Terrestrial
Spineflower, Slender-horned	*Dodecahema leptoceras*	Dicot	Terrestrial
Spineflower, Sonoma	*Chorizanthe valida*	Dicot	Terrestrial
Spiraea, Virginia	*Spiraea virginiana*	Dicot	Terrestrial
Spurge, Deltoid	*Chamaesyce deltoidea ssp. deltoidea*	Dicot	Terrestrial
Spurge, Garber's	*Chamaesyce garberi*	Dicot	Terrestrial
Spurge, Hoover's	*Chamaesyce hooveri*	Dicot	Vernal pool
Spurge, Telephus	*Euphorbia telephioides*	Dicot	Terrestrial
Stenogyne angustifolia (ncn)	*Stenogyne angustifolia var. angustifolia*	Dicot	Terrestrial
Stenogyne bifida (ncn)	*Stenogyne bifida*	Dicot	Terrestrial
Stenogyne campanulata (ncn)	*Stenogyne campanulata*	Dicot	Terrestrial
Stenogyne kanehoana (ncn)	*Stenogyne kanehoana*	Dicot	Terrestrial
Stickseed, Showy	*Hackelia venusta*	Dicot	Terrestrial
Stickyseed, Baker's	*Blennosperma bakeri*	Dicot	Vernal pool
Stonecrop, Lake County	*Parvisedum leiocarpum*	Dicot	Vernal pool
Sumac, Michaux's	*Rhus michauxii*	Dicot	Terrestrial
Sunflower, Pecos	*Helianthus paradoxus*	Dicot	Terrestrial, Freshwater
Sunflower, San Mateo Woolly	*Eriophyllum latilobum*	Dicot	Terrestrial

Sunflower, Schweinitz's	*Helianthus schweinitzii*	Dicot	Terrestrial
Sunray, Ash Meadows	*Enceliopsis nudicaulis var. corrugata*	Dicot	Terrestrial
Taraxacum, California	*Taraxacum californicum*	Dicot	Terrestrial
Tarplant, Gaviota	*Deinandra increscens ssp. villosa*	Dicot	Terrestrial
Tarplant, Otay	*Deinandra (=Hemizonia) conjugens*	Dicot	Terrestrial
Tarplant, Santa Cruz	*Holocarpha macradenia*	Dicot	Terrestrial
Tectaria Estremerana	*Tectaria estremerana*	Ferns	Terrestrial
Ternstroemia subsessilis (ncn)	*Ternstroemia subsessilis*	Dicot	Terrestrial
Tetramolopium arenarium (ncn)	*Tetramolopium arenarium*	Dicot	Terrestrial
Tetramolopium capillare (ncn)	*Tetramolopium capillare*	Dicot	Terrestrial
Tetramolopium filiforme (ncn)	*Tetramolopium filiforme*	Dicot	Terrestrial
Tetramolopium lepidotum ssp. lepidotum (ncn)	*Tetramolopium lepidotum ssp. lepidotum*	Dicot	Terrestrial
Tetramolopium remyi (ncn)	*Tetramolopium remyi*	Dicot	Terrestrial
Tetramolopium rockii (ncn)	*Tetramolopium rockii*	Dicot	Coastal (neritic), Terrestrial
Thelypody, Howell's Spectacular	*Thelypodium howellii spectabilis*	Dicot	Terrestrial
Thistle, Chorro creek Bog	*Cirsium fontinale var. obispoense*	Dicot	Terrestrial, Freshwater
Thistle, Fountain	*Cirsium fontinale var. fontinale*	Dicot	Terrestrial
Thistle, La Graciosa	*Cirsium loncholepis*	Dicot	Coastal (neritic), Freshwater, Saltwater, Brackish
Thistle, Pitcher's	*Cirsium pitcheri*	Dicot	Terrestrial
Thistle, Sacramento Mountains	*Cirsium vinaceum*	Dicot	Terrestrial
Thistle, Suisun	*Cirsium hydrophilum var. hydrophilum*	Dicot	Brackish, Terrestrial
Thornmint, San Diego	*Acanthomintha ilicifolia*	Dicot	Terrestrial
Thornmint, San Mateo	*Acanthomintha obovata ssp. duttonii*	Dicot	Terrestrial
Torreya, Florida	*Torreya taxifolia*	Conf/cycds	Terrestrial
Tree Fern, Elfin	*Cyathea dryopteroides*	Ferns	Terrestrial
Trematolobelia singularis (ncn)	*Trematolobelia singularis*	Dicot	Terrestrial
Trillium, Persistent	*Trillium persistens*	Monocot	Terrestrial
Trillium, Relict	*Trillium reliquum*	Monocot	Terrestrial
Tuctoria, Green's	*Tuctoria greenei*	Dicot	Vernal pool
Uhiuhi (Caesalpinia kavaiensis)	*Caesalpinia kavaiense*	Dicot	Terrestrial

Ulihi (Phyllostegia glabra var. lanaiensis)	*Phyllostegia glabra var. lanaiensis*	Dicot	Terrestrial
Umbel, Huachuca Water	*Lilaeopsis schaffneriana var. recurva*	Dicot	Terrestrial, Freshwater
Uvillo	*Eugenia haematocarpa*	Dicot	Terrestrial
Vernonia Proctorii (ncn)	*Vernonia proctorii*	Dicot	Terrestrial
Vervain, California	*Verbena californica*	Dicot	Terrestrial
Vetch, Hawaiian (Vicia menziesii)	*Vicia menziesii*	Dicot	Terrestrial
Vigna o-wahuensis (ncn)	*Vigna o-wahuensis*	Dicot	Terrestrial
Viola helenae (ncn)	*Viola helenae*	Dicot	Terrestrial
Viola lanaiensis (ncn)	*Viola lanaiensis*	Dicot	Terrestrial
Viola oahuensis (ncn)	*Viola oahuensis*	Dicot	Terrestrial
Wahane (Pritchardia aylmer-robinsonii)	*Pritchardia aylmer-robinsonii*	Monocot	Terrestrial
Wahine Noho Kula (Isodendrion pyrifolium)	*Isodendrion pyrifolium*	Dicot	Terrestrial
Wallflower, Ben Lomond	*Erysimum teretifolium*	Dicot	Terrestrial
Wallflower, Contra Costa	*Erysimum capitatum var. angustatum*	Dicot	Terrestrial
Wallflower, Menzie's	*Erysimum menziesii*	Dicot	Terrestrial
Walnut, Nogal	*Juglans jamaicensis*	Dicot	Terrestrial
Warea, Wide-leaf	*Warea amplexifolia*	Dicot	Terrestrial
Watercress, Gambel's	*Rorippa gambellii*	Dicot	Terrestrial, Brackish, Freshwater
Water-plantain, Kral's	*Sagittaria secundifolia*	Monocot	Freshwater
Water-willow, Cooley's	*Justicia cooleyi*	Dicot	Terrestrial
Wawae'lole (Phlegmariurus (=Huperzia) mannii)	*Huperzia mannii*	Ferns	Terrestrial
Wawae'lole (Phlegmariurus (=Lycopodium) nutans)	*Lycopodium (=Phlegmariurus) nutans*	Ferns	Terrestrial
Whitlow-wort, Papery	*Paronychia chartacea*	Dicot	Terrestrial
Wild-buckwheat, Clay-loving	*Eriogonum pelinophilum*	Dicot	Terrestrial
Wild-buckwheat, Gypsum	*Eriogonum gypsophilum*	Dicot	Terrestrial
Wild-rice, Texas	*Zizania texana*	Monocot	Freshwater
Wings, Pigeon	*Clitoria fragrans*	Dicot	Terrestrial
Wireweed	*Polygonella basiramia*	Dicot	Terrestrial
Woodland-star, San Clemente Island	*Lithophragma maximum*	Dicot	Terrestrial

Conf/cycd Dicot Ferns Monocot

Woolly-star, Santa Ana River	*Eriastrum densifolium ssp. sanctorum*	Dicot	Terrestrial
Woolly-threads, San Joaquin	*Monolopia (=Lembertia) congdonii*	Dicot	Terrestrial
Xylosma crenatum (ncn)	*Xylosma crenatum*	Dicot	Terrestrial
Yerba Santa, Lompoc	*Eriodictyon capitatum*	Dicot	Terrestrial
Ziziphus, Florida	*Ziziphus celata*	Dicot	Terrestrial

No species were selected for exclusion.

Dispersed species included in report.